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LIST OF CONTRIBUTORS.

- ADKIN, ROBERT, F.E.S., 45
 ALDERSON, Miss E. MAUDE, 75
 ALDERSON, Mrs. M., 266
 ALLEN, J. E. R., 268
 ANDERSON, JOSEPH, 322
 ANSORGE, E. C., 322
 ARKLE, J., 118
 BAGWELL-PUREFOY, E., 301
 BANKES, EUSTACE R., M.A., F.R.S., 194,
 320
 BARRETT, J. P., 242, 243
 BEESTON, S. J., 144
 BIGNELL, G. C., F.E.S., 322
 BIRCH, FREDERICK, 5, 175
 BLENKARN, STANLEY A., 323
 BOXER, C. R. Y., 326
 BRADLEY, HENRY H. BENTON, 143
 BROWNE, G. B., 267, 270, 288
 BROWN, HENRY H., 219, 267
 BURTON, WILLIAM, 219
 BUTLER, W. E. 285, 287, 288
 CAMERON, PETER, 18, 38, 108, 179, 206,
 237, 263, 312
 CARDINAL, A. W., 266
 CARR, F. M. B., 75, 145, 172, 218, 247
 CHAPMAN, Dr. T. A., F.Z.S., F.E.S., 42,
 81, 138, 159, 225, 252
 CHARLES, HERBERT, 242
 CHRISTY, W. M., M.A., F.Z.S., F.L.S.,
 F.E.S., 146
 CLAXTON, Rev. W., 326
 COCKAYNE, E. A., 219
 COCKERELL, T. D. A., F.Z.S., 15, 58,
 111, 114, 177, 194, 232, 257, 285, 317
 COLTHRUP, C. W., 320, 322
 DALE, C. W., F.E.S., 115, 170, 286, 323
 DAVIS, M. J. L., 115
 DAY, GEO. O., 144
 DISTANT, W. L., F.E.S., 212, 256
 DODD, F. P., 16, 17, 43, 44, 73, 153,
 184, 194
 DONOVAN, Capt. C., M.D., F.E.S., &c., 10
 DONOVAN, R. J. F., 10
 DOUGLAS, JAMES, 24, 25
 FAYE, H. G., 322
 FINZI, J. A., F.E.S., 195
 FITCH, RICHARD J., 244
 FORSYTHE, C. H., 246
 FOUNTAINE, MARGARET E., F.E.S., 60, 97
 FREKE, PERCY E., F.E.S., 197
 FROHAWK, F. W., F.E.S., &c., 27, 285,
 286, 297
 GLOVER, Rev. GEORGE, 218
 GOODWIN, EDWARD, 195
 GOSS, HERBERT, F.L.S., F.E.S., &c., 149,
 293, 327
 GOULTON, E. C., 267
 GRAHAM, STEPHEN, 269
 GREEN, E. ERNEST, F.E.S., 202
 HAGGART, J. C., 172
 HAMPSON, Sir GEORGE F., Bart., B.A.,
 F.Z.S., F.E.S., 193
 HANSEN, Dr. H. J., 214, 234, 260
 HARDY, WALTER E., 266
 HARRISON, J. W., 173
 HARVEY-JELLIE, B., 73
 HICKLIN, B., 244
 HILL, J. & W., 27
 HITCHCOCK, F. N., 288
 HODGE, HAROLD, 268, 285, 286
 HODSON, LAWRENCE S., 287
 HOOKER, W. G., 323
 INMS, A. D., 157
 JACOBY, MARTIN, F.E.S., 203
 JAGER, J., 287
 JEFFERYS, T. B., 76
 JOB, HERBERT S., 220
 JOHNS, E. J., 219
 JOHNSON, C. F., 47, 266
 JOURDAIN, FRANCIS C. R., 267
 KAYE, W. J. K., F.E.S., 334
 KEMP, S. W., F.E.S., 268
 KIRBY, W. F., F.L.S., F.E.S., 22, 80
 KIRKALDY, G. W., F.E.S., 32, 56, 63,
 128, 136, 151, 152, 164, 176, 199, 214,
 224, 234, 248, 260, 272, 280, 296, 315,
 316, 319, 334
 LADDIMAN, R., 266
 LANG, Rev. HENRY CHARLES, M.D.,
 F.E.S., &c., 228
 LAWRENCE, A. J., 23, 242, 287, 291
 LEIGH, G. F., F.E.S., 74, 243, 321
 LITTLEWOOD, FRANK, 44
 LUCAS, W. J., B.A., F.E.S., 33, 53, 79,
 80, 116, 127, 147, 151, 183, 266, 268,
 294, 295
 MARSHALL, A., 28
 MATHEW, GERVASE F., R.N., F.L.S., F.E.S.
 197
 MAY, ALBERT, 195
 MEADE-WALDO, G., 196
 MELDOLA, Prof. R., F.R.S., F.E.S., 244
 MIDDLETON, B. L., 27, 321
 MILTON, F., 25, 26
 NASH, W. GIFFORD, 172
 NEWMAN, L. W., 25
 NEWMAN, T. P., 322
 NIX, JOHN A., 197
 NURSE, Major C. G., F.E.S., &c., 304
 OLDAKER, F. A., 121, 218, 285, 326
 PALLAS, M., 74
 PERKS, H., 244
 PILCHER, Colonel J. C., F.R.C.C., 39
 PORRITT, GEO. T., F.Z.S., F.E.S., 27,
 145
 PREST, E. E. B., 289

PYETT, CLAUDE A., 2, 241	SOUTH, RICHARD, 2, 23, 25, 45, 74, 74,
QUAIL, AMBROSE, F.E.S., 57	127, 143, 144, 156, 170, 200, 220, 221,
RAYNOR, Rev. GILBERT H., 45, 288	243, 244, 267, 268, 284, 285, 321
ROBERTSON, R. B., 323	SPENCER, L. A., 266
ROSA, A. F., M.B., C.M., 93	STOCKWELL, H. DOUGLAS, 25
ROWLAND-BROWN, H., M.A., F.E.S., 30,	SWEETING, H. W., 287
49, 78, 122, 149, 174, 198, 202, 223,	TAIT, R., 14
292	TETLEY, J. B., 144
RUSSELL, G. W., 244	THURNALL, A., 129, 167, 188, 208, 265
RYDON, A. H., 286	TOWELL, P., 285
SABINE, E., 115	TURNER, HY. J., F.E.S., 31, 51, 78, 124,
SETH-SMITH, L. M., 24	149, 175, 199, 223, 272, 294, 329
SHARPE, Miss EMILY MARY, 40, 65, 101,	WAINWRIGHT, COLBRAN J., F.E.S., 52, 79,
135, 276, 308	125, 150, 219, 223, 249, 330
SHAW, V. E., 196	WALKER, Rev. F. A., D.D., F.E.S., 116,
SHEPHEARD-WALWYN, H. W., F.E.S., 323	147
SICH, ALFRED, F.E.S., 43	WALLER, F. G., 194
SLADEN, Rev. C. A., 74, 242, 244, 273	WOODFORDE, F. C., B.A., F.E.S., 275
SMALLMAN, RALEIGH S., 220	WOODGATE, H., 323
SMITH, GEOFFREY, 7, 69, 89	WRIGHT, T., 25, 74
SOPP, E. J. BURGESS, F.E.S., 126, 150, 332	

PLATES.

I.—Nymph of <i>Oxygastra curtisii</i>	to face	PAGE 33
II.—Group: Members of the Entomological Society of London at Oxford		201
III.— <i>Meriania argentifera</i>		249
IV.—Larva and Pupa of <i>Liphyra brassolis</i>		297

ILLUSTRATIONS IN THE TEXT.

Some Aberrations of British Butterflies captured in 1901	1
<i>Lucanus cervus</i>	53
<i>Vanessa atalanta</i>	53
<i>Acidalia marginepunctata</i>	156

INSTRUCTIONS to BINDER.—The SPECIAL INDEX, given with the 'Entomologist' for January, 1903, belongs to this Volume, and should be placed next to to this General Index.

INDEX.

GENERAL.

- Aberration of *Vanessa urticæ*, 23, 265;
Zygæna minos, 265
 Aberrations of British Butterflies captured in 1901, Some, 1
 Abundance of *Melitæa aurinia* in Co. Westmeath, 27
Acherontia atropos in Westmoreland, 43
Acidalia marginepunctata ab. (fig.), 156, 219
Agrilus sinuatus in Hampshire, 288
Agrotis cinerea, 322
Agrotis obelisca—a correction, 288
Amphidasys betularia var. *doubledayaria* in Essex, 197
 A new genus of South African Coccidæ, 15
Apamea ophiogramma at Balham, 267
Aporia cratægi in Kent, 243
 Are cocoons waterproof? 241
Asphalia diluta in Chester district, 164
 Autumnal emergence of *Cerigo cytherea*, 23
 Bat killing a moth at sugar, 73
 Bilateral asymmetry in male appendages of a Sphinx, 173
Blatta australasiæ in South Derbyshire, 267
 British Museum Collection of British Lepidoptera, The, 193
 British Orthoptera, 219; Tachinidæ, 219
 Butterflies collected in Equatorial Africa by Captain Clement Sykes, On the, 276, 308; in Mid-Surrey, Easter, 1902, 144; of the Witherslack district, 245; of Syria and Palestine, A few notes on some of the, 60, 97
 Butterfly collecting in Southern Andalusia in the spring of 1902, 228
Calocampa exoleta, Note on, 195
 Carnivorous Lycænid larvæ, On, 202
 Catalogue of the Lepidoptera of Ireland, 115
Cerastis erythrocephala near Bourne-mouth, 323
Chariclea delphinii, 25
Chærocampa celerio, 44; in Hampshire, 287
Chrosis bifasciana in Surrey, 244
Chrysophanus dispar, Haw., 321
 Classification of Gracilaria and allied genera, 81, 138, 159
 Coccidæ, South African, 15
 Coccid genus *Aulacaspis*. The, 58
 Coleoptera, 151, 152
Colias edusa at Bexhill, 285; in Cornwall, 286; in Essex, 244; in Kent, 322; in Surrey, 266; in Sussex, 285; in the New Forest, 322; in Wales, 244; near Norwich, 266
Colias edusa and *hyale* in 1902, 197
Colias hyale and *C. edusa* in Kent, 285
Colias hyale and *Sphinx convolvuli* in Wiltshire in 1901, 74
Colias hyale near Dartford in 1902, 115
 Collecting at Deal, 246, 269; near Tangier in August and September, 195
 Colour changes in larval hairs of *Arctia villica*, 194
 Contribution to the classification of the Coccidæ, 232, 257
 Correction, 27
Cyaniris argiolus, Two notes on, 44
Cyaniris (Lycæna) argiolus in Westminster, 266; Note on a habit of, 43
Cymatophora octogesima (ocularis) and *Plusia moneta* in Middlesex, 220
Deilephila livornica in South Devon, larva of, 287, 322
 Description of a new Grasshopper from Natal (*Pomatonota bipunctata*, Kirby), 22
 Description of a new species of Cicadidæ from Ceylon, 256
 Descriptions of two new genera and thirteen new species of Ichneumonidæ from India, 18
 Descriptions of two new species of the genus *Planema* from the Uganda Protectorate, 135
Dicycla oo in Kent, 267, 287; in Middlesex, 287
 Diptera, 32, 151
Ditula semifasciana and *Antithesia salicella* in Surrey, 220
 Dragonflies in 1901, 33; in the Norfolk Broads, 146
 Dragonfly in London, 323

- Early appearance of *Euchelia jacobæ*, 144
 Earwig (*Labidura riparia*) at Pokesdown, The large, 268
 Emergence of *Antheræa* from the Cocoon, The, 143; *Melanippe galiata* in December, 45
Ennomos erosaria and *Himera pennaria*, 322
 Entomological Club, The, 45
 Erratum, 152
*Erythromma naia*s in Berks, 268
 Essex Dragonflies, 116
Eupithecia jasideata in North Wales, 268; *trisignaria* in Scotland, 197
- Fauna of Mexico (Bees and Coccidæ), Additions to, 177
 Five days collecting at Deal, 246
 Food-plants of the larva of *Cnephasia sinuana*, Steph., 194, 265, 320
 Formation of Pattern on eggshell of a species of *Lepidoptera*, 57
 Fortnight at Deal, A, 269
- Gall-making *Cynipidæ*, Description of a new species of, 38
 Genera and species of *Hymenoptera*, On some new, 108, 79, 206, 237, 263, 312
Genus Clunio, Hal., Notes on the, 157
 Genus of South African Coccidæ, A new, 15
Gonepteryx rhamni ab., 284
Gonepteryx rhamni and *cleopatra* in Ireland, 301
Gonepteryx rhamni in November, 323
Gordius in a butterfly, 42
 Grasshopper from Natal, A new, 22
 Gynandromorphism in *Diptera*, 32
 Gynandrous *Argynnis paphia*, 242
 Gynandrous examples of *Amphidasys betularia*, 72
 Gynandrous (Hermaphrodite) specimen of *Argynnis paphia*, 291
 Gynandrous example of *Lycæna icarus*, 218
 Gynandrous specimen of *Agrotis puta*, 121
 Gynandrous specimen of *Anthocharis cardamines*, 197
- Habits of *Macrothylacia (Bombyx) rubi*, On the, 24
Harpella bracteella, 75
 Hawk-moth pupating in branches of trees, 73, 194; on trees, 321
Hedya lariciana in Surrey, 220
Hepialus humuli var. *thulensis*, Newman, 170
 Hybrid *Malacosoma castrensis* × *M. neustria*, 122
Hydrelia uncula in Surrey, 220
Hymenoptera, 151
- Hymenoptera-Aculeata* of the Oxford district, 74
- Ichneumonidæ* from India, 18
Ichneumon in *Zygæna trifolii*, 241
Insecta of Surrey, 143
 Instrument with which Moths of the genus *Antheræa* cut out of their hard cocoons, 16
Iphielides (Papilio) podalirius in Lancashire, 219
- Larvæ and pupæ of *Plusia moneta* in London, 220
 Larvæ in Durham, 173
 Larvæ of *Chrysophanus phleas*, Note on, 114
 Larvæ of *Cossus ligniperda* at Vauxhall, 144
 Larva of *Liphyra brassolis*, Westw., On the, 225, 252
Lasiocampa quercifolia in London, 244
 Late appearances, 323
 Late emergence of *Cucullia asteris*, 287
Lecanopsis dugési, The Coccid, 194
Lepidoptera, 32, 151, 152
Lepidoptera at the New Forest in June, 289
Lepidoptera at Witherslack, 47
Lepidoptera collected by Dr. Cuthbert Christy in Nigeria, A list of, 65, 101
Lepidoptera-Heterocera of Paris, 116
Lepidoptera in Ross-shire in 1901, 145
Lepidoptera in Suffolk in 1901, Notes on, 2
Lepidoptera of County Cork, 10
Lestes dryas at Hanwell, Middlesex, 268
Lestes dryas at Wicken, 268
 Life-history of *Liphyra brassolis*, Westw., Contribution to the, 153, 184
 Life-history of *Vanessa antiopa*, 297
 List of British *Diptera*, 74
 List of butterflies from the Rhone Valley, An additional, 93
 List of the *Lepidoptera* of County Cork, A, 10
Luperina dumerili at Dover, 25
Lycæna argiolus at Rotherhithe, 286
Lycæna corydon ab., 284, 321
Lycæna minima var. *alsoides* in Hampshire, 243
- Macro-lepidoptera in North Staffordshire in 1901, 26
 March Notes from Kent, 1902, 144
Meriania argentifera, Meig., a Tachinid new to Britain, 249
Mesotype virgata (lineolata) in Berkshire, 288
 Methods used to preserve colour in relaxing entomological specimens, On, 39
 Miscellaneous *Rhynchotalia*. No. 3, 136; No. 4, 164; No. 5, 280

Morphology and Classification of the Auchenorrhynchous Homoptera, On the, 214, 234, 260

National Collection of British Lepidoptera, The, 170

Neuroptera, 32, 248

Neuroptera of Oxon and Berks, Notes on, 183

New butterflies from East Africa, Descriptions of, 40

New Forest Notes, 170

New species of Heterocera from the Transvaal, Descriptions of, 216

New species of Indian Chrysididæ, 304

New species of Phytophagous Coleoptera from the Island of Mauritius, Descriptions of some, 203

Nola albulalis and Nonagria sparganii in South Devon, 27

Nomenclature of the Coccidæ, 114

North Staffordshire form of Zonosoma (Ephyra) pendularia, The, 275

Note on Euzophora pinguis, 265

Notes from Dorking for the season of 1901, 118; from East Suffolk, 1901, 45; from Shropshire, 326; on Lepidoptera in August, 268; on the season 1901, 75

Notodonta carmelita in South Scotland, 172; dryinopa, 42, 193

OBITUARY:—

Charles Lionel de Nicéville, 79

Major Alfred Ficklin, 80

J. B. Williamson, 248

Odonata, &c., at Camberley, Surrey, 74

Odonata bred in 1902, 267

Odonata in Paris, 147

Ophiodes lunaris in Cheshire, 25, 74

Ornithoptera carsandra and O. richmondia, 17

Orrhodia rubiginea, 322

Orthoptera, 151

Papilio machaon in Berks, 286

Parental care of the Cimicidæ (Rhynchota), 319

Pieridæ at Winchmore Hill, 244; in London, 243

Pieris daphidice in Sussex, 286; napi twelvemonths in pupa, 242

Pionea (Ebulea), stachydalis in Surrey, 244

Plusia moneta, a few notes and queries, 242; in England, 320; at Finchley, 196; in London, 243; in Surrey, 244; in Wilts, 244; larvæ at Farnborough, 172; near Tunbridge Wells, 323

Polyommatus (Lycæna) artaxerxes, Fabr. in Banffshire, 266

Prionus coriarius in Berkshire and Hertfordshire, 267

Proposed Entomological Society in Manchester, 266

Protracted emergence of Tephrosia biundularia, 195

Psamotis pulveralis in Surrey, 268

Publication date of the Rhynchotal Part of the Voyage of the 'Coquille,' 316

Pyrameis (Vanessa) cardui in Fifeshire, 219; at 1050 ft. in Banffshire, 267

Raphidia larva attacked by a Fungus, 266

Rare Trichoptera at Glanvilles Wootton, Captures of, 323

Rearing Agrotis ashworthii and Acidalia contiguaris, 14

RECENT LITERATURE:—

A List of the Beetles of Ireland (W. F. Johnson & J. H. Halbert), 272

A Revision of the North American Species of Athysanus (H. Osborn & E. D. Ball, 199

A Systematic Arrangement of the Diptera (D. W. Coquillett), 31

Aquatic Insects in the Adirondacks (J. G. Needham), 295

British Lepidoptera (J. W. Tutt), 332

British Tyroglyphidæ (A. D. Michael), 176

Butterflies and Moths of Europe (W. F. Kirby), 200

Catalogue of the Described Orthoptera of the United States and Canada (S. H. Scudder), 294

Catalogue of the Lepidoptera of Ireland (W. F. de V. Kane), 54

Descent of Man and Origin of Species (C. Darwin), 128

Die Hemipteren von Celebes (G. Bredin), 224

Economic, 331

Elm-leaf Beetle in New York State (E. P. Fell), 296

Fauna Analytique illustrée des Orthoptères de France (C. Houlbert), 295

Fauna Hawaiiensis (W. H. Ashmead), 127

First Report of the Natal Government Entomologist (Claude Fuller), 199

Gartenfeinde und Gartenfreund (H. Kolbe), 176

Genera Insectorum (Wytsman), 295

Handbook of the Natural History of Glasgow, 126

Insect Enemies of the Spruce in the North-east (A. D. Hopkins), 128

Insects injurious to the Elm-trees (E. P. Fell), 151

Insect Life: Souvenirs of a Naturalist (J. H. Fabre), 79

Les Odonates du Continent Australien (M. René Martin), 151

- Photography for Naturalists (Douglas English), 52
- Pink Grasshoppers (S. H. Scudder), 32
- Proceedings of the South London Entomological and Natural History Society (1901), 200
- Scale Insects of Importance and a list of the Species in New York State (E. P. Fell), 128
- The Hessian Fly (E. P. Fell), 296
- The Skeleton of the head of Insects (J. H. Comstock & Chujiro Kochi), 152
- The Stridulatory Organs of Waterbugs (G. W. Kirkaldy), 127
- The Tettigidae of North America, 294
- Transactions of the City of London Entomological and Natural History Society (1901), 200 [322]
- Reminiscences of the late Miss Ormerod, REPORTS OF SOCIETIES:—
- Birmingham Entomological, 52, 78, 124, 150, 175, 223, 329
- London Entomological, 28, 47, 76, 121, 148, 173, 197, 221, 291, 326
- Lancashire and Cheshire Entomological, 51, 125, 149, 175, 330
- South London Entomological and Natural History, 30, 49, 78, 123, 149, 174, 198, 223, 271, 293, 327
- Rhodophaea formosa and Oncocera ahenella in Herts, 244
- Rhynchota, 32, 151, 152, 248, 336
- Rhynchota, Notes on the division Veliaria, 63
- Sesia allantiformis, Newm. (= andreniformis, Lasp.) in Dorsetshire, Capture of, 286
- Sesia myopiformis in London, 286
- Scent organs of Hepialidae, 73
- Season 1901, The past, 75
- Season of 1902, The 323
- South African Coccidae, 111
- South Devon Micro-lepidoptera, 145
- Sphinx convolvuli and Acherontia atropos in London and Somersetshire, 25
- Sphinx convolvuli in Dorsetshire, 24; in 1901, 172; on Dartmoor, 172
- Sphinx pinastri at Winchester, 219
- Stauropus fagi at Mickleham, 267
- Thecla w-album and Colias edusa in Bristol district, 115 [23]
- Third brood of Phragmatobia fuliginosa, Three weeks in South Dorset, 288
- Tortrices in South Essex, 194; taken in South Essex between 1885 and 1901, A list of, 129, 166, 188, 208
- Tortrix piceana and Sericoris bifasciana in the Esher district, 220
- Treatment of pupæ during the winter, 26
- Two varieties of *Lycæna icarus*, 218
- Typhlocyba coloradensis in Mexico, 285
- Unusual pairing of Butterflies, 242
- Vanessa antiopa*, Life-history of, 297; *urticæ* ab., 321
- Vanessidae in 1901, 27; in 1902, 322
- Variation in the genus *Erebica*, 7, 69, 89; of *Lycæna corydon* in North Wilts, 273
- VARIETIES:—
- Abraxas grossulariata*, 199 [219]
- Acidalia marginepunctata*, 156, 175,
- Acronycta menyanthidis*, 50
- Agrotis puta*, 121; *ripæ*, 271; *segetum*, 124
- Amphidasys betularia*, 218
- Arctia plantaginis*, 150 [50]
- Argynnis adippe*, 50; *aglaia*, 1; *selene*,
- Asphalia ridens*, 293
- Anchocelis rufina*, 50
- Callimorpha dominula*, 291
- Chrysophanus phloæas*, 2, 121
- Cosmia trapezina*, 50
- Dilina tiliae*, 221
- Ematurga atomaria*, 294
- Epinephele ianira*, 2
- Euchloë cardamines*, 2
- Gonepteryx rhamni*, 284
- Hybernia leucophæaria*, 174
- Larentia multistrigaria*, 148
- Lycæna arion*, 292; *corydon*, 2, 273, 274, 284, 292, 294, 321; *icarus*, 218; *minima*, 294
- Macaria liturata*, 124
- Mania typica*, 50
- Melitæa cinxia*, 50
- Metæcus paradoxus*, 292
- Noctua sobrina*, 121
- Odontopera bidentata*, 50
- Papilio demoleus*, 291
- Pieris brassicæ*, 50
- Plusia gamma*, 51
- Prionus californicus*, 150
- Psilura monacha*, 198
- Pygæra curtula*, 293
- Rhodophaea consociella*, 4
- Satyrus semele*, 124
- Tæniocampa opima*, 198
- Vanessa antiopa*, 285; *polychloros*, 121; *urticæ* 322
- Xylophasia polyodon*, 50
- Zonosoma pendularia*, 50, 275
- Variety of the moth *Hypsa substracta* (Walk.), 73
- Visit of the Entomological Society of London to Oxford, 201
- What is *Monophlebus*, Leach? 317
- White Ant or Termites, 218
- Xanthia* (Mellinia) *ocellaris* in North Kent, 25
- Xylina furcifera* (conformis) in Lancashire, 25
- Yorkshire Dragonflies, 115

SPECIAL INDEX.

New Genera and Species are marked with an asterisk.

COLEOPTERA.

- Abdera bifasciata*, 293
Acrosinus longimanus, 199
Adalia bipunctata, 152
Ægialia rufa, 51, 126, 331
Agrilus angustatus, 293
Agrilus biguttatus, 331
Ammœcius brevis, 331
Anatis ocellata, 172
Anisotoma ciliaris, furva, 331
Anthaxia nitidula, 331
Antherophagus nigricornis, 293
Anthia thoracica, 77
Aphodius villosus, 51
Apion miniatum, 172; *sedi*, 271
Attagenus pellis, 223
Balaninus villosus, 172
Baris lapidii, 293
Barynotus schönherri, 271
Bembidium argentiolum, 271, 272, 291;
 bipunctatum, 271; *decorum*, 293;
 saxatile, 126; *stomoides*, 126
Berosus affinis, 126
Bidessus geminus, 293
Blethisa multipunctata, 271
Brachycerus granosus, 77
Byrrhus pilula, 172
Carabus clathratus, 271; *exasperatus*,
 293; *violaceus*, 293
Carcinops 14-striata, 126
Cathormiocerus socius, 293
Cerambyx heros, 293
Cercyon littorale, 271
Cetonia anrata, 74
Ceuthorrhynchus euphorbiæ, 331
Chlænus nigricornis, 271
Chrysomela banksii, distinguenda, 271
Cicindela campestris, 74, 172
Cillenus lateralis, 271
Clytus arietis, mysticus, 50
Cneorrhinus geminatus, 247
Coccinella septempunctata, 172
Cœlambus impresso-punctatus, 293;
 quinque-lineatus, 271; *novem-*
 lineatus, 271
Cœnobius sulcicollis,* 203
Crypticus quisquilius, 247
Cryptocephalus aureolus, 74; *sexpunc-*
 tatus, 331
Dascillus cervinus, 247
Dendroctonus piceaperda, 128
Dermestes aurichalceus, 77; *depressus*,
 172; *latus*, 293
Dibolia cynoglossi, 291
Diglossa mersa, 271
Donacia lemnæ, linearis, sericea, 247
 thalassina, 293
Drilus flavescens, 327
Dromius quadrimaculatus, 172
Dyschirius obscurus, 272
Elater lythrophterus, miniatus, sanguino-
 lentus, 331
Endomychus coccineus, 149
Galerucella luteola, 151, 296
Geotrupes stercorarius, 74; *typhæus*,
 172
Gymnetron collinus, 331; *linariæ*, 293,
 331
Hæmonia appendiculata, 271
Halyzia 16-guttata, 293
Harpalus ruficornis, sabulicola, 247
Helops striatus, 172
Heptaulacus villosus, 126
Hister merdarius, 291, 293; *12-striatus*,
 291
Hydaticus seminiger, 293
Hydroporus, 271; *tristis, umbrosus*, 293
Hydrovatus clypealis, 331
Hylobius abietis, 172
Hypera variabilis, 247
Ilybius ater, 293
Læmostenus complanatus, 271, 292
Leptura distigma, 77; *livida*, 247; *rubra*,
 sanguinolenta, stragulata, unipunc-
 tata, 77
Liosoma collaris, ovatum, 124
Lucanus cervus, 53
Magdalis armicollis, barbata, 151
Malachius viridis, 247
Medon obsoletus, 331
Melanotus punctolineatus, 271
Meloë violaceus, 271
Metœcus paradoxus, 291, 292, 332
Molorchus minor, 50
Molytes germanus, 247
Nebria gyllenhali, 124
Orectochilus villosus, 271

Orina smaragdina, tristis, 292
 Otiorrhynchus atroapterus, 247; auro-punctatus, 56, 271, 272
 Pachyta cerambyciformis, 50
 Pæderus riparius, 293
 Pelobius tardus, 293
 Pelophila borealis, 271
 Phosphæus hemipterus, 331
 Phytosus balticus, 271
 Polydrusus chrysomela, 271
 Prionus californicus, 150; coriarius, 267, 293
 Pristonychus terricola, 271
 Pseudopsis sulcata, 331
 Pterostichus cupreus, 271; oblongo-punctatus, 124; striola, 172
 Ptilinus pectinicornis, 149
 Purpuricenus kochleri, 293
 Pyrochroa serraticornis, 147, 247
 Quedius oblitteratus, suturalis, 327
 Rhagium bifasciatum, 172
 Rhantus bistriatus, 293

Rhopalomesites tardyi, 271
 Rhynchites æneo-virens, pauxillus, 172
 Rhyparida bimaculicollis, * 203
 Saperda scalaris, 331; tridentata, 151
 Saprinus maritimus, virescens, 271
 Scymnus suturalis, 172
 Silpha atrata, subrotundata, 271, 272
 Staphylinus cæsaureus, 172
 Stenus argentellus, 272
 Stephanocrates dohertyi, 122
 Strangalia pubescens, 77
 Telephorus darwinianus, 271, 331
 Thinobius brevipennis, 331
 Tomoxia biguttata, 293
 Trichostola* fasciatipennis, 205; *femor-
 alis, 205; *thoracica, 204; *puncti-
 collis, 204; rugulosa, 204
 Trigonogenius globulus, 51
 Tropiphorus tomentosus, 126
 Xantholinus cribripennis, 272
 Xyleborus drygraphus, 293
 Zabrus gibbus, 271

DIPTERA.

Anopheles rossii, 335
 Anthrax velutina, 175
 Brachychæta spinigera, 52
 Cecidomyia destructor, 296, 334
 Chironomus oceanicus, 158
 Clunio, 52, 157; adriaticus, 158; bicolor, 151, 157; marinus, 157; syzigialis, 158
 Desvoidea fusca, 52
 Dilophus tibialis, 32
 Drosophila, 128
 Halirytus amphibius, 158
 Hilara wheeleri, 32
 Hyetodesia vagans, 124
 Meriania argentifera, 223, 249, 330;
 borealis, 250; puparum, 250, 330;
 silvatica, 250

Nemoræa argentifera, puparum, 250
 Pampterinus latipennis, 198
 Pericoma auriculata, 48; cognata, 49;
 fusca, 48, 49; mutua, 49; notabilis,
 nubila, 48; palustris, 49; soleata,
 trivialis, 48 [293
 Physocephala chrysorrhœa, 175; nigra,
 Platychira puparum, radicum, strenua,
 Simulium, 292 [250
 Staurochæta gracilis, 52
 Syrphus barbifrons, 223
 Systropus brasiliensis, 123
 Tipula oleracea, 52
 Trypetidæ, 223
 Ulomyia fuliginosa, 48
 Volucella elegans, 175; inanis, 329

HYMENOPTERA.

Acanthojoppa, *Cam., 109; schizoaspis, *
 Cam., 110
 Agapostemon texanus, 178
 Agenia hircana, 175
 Amblyjoppa, *Cam., 108; ælvanus,
 rufobalteata, *Cam., 108
 Ampulex assimilis, brevicornis, *Cam.,
 cognata, latifrons, 312; longicollis, *
 Cam., 263; trigona, *Cam., 264
 Andrena denticulata, pilipes, thoracica,
 125
 Andricus, 39
 Apis mellifica, 126
 Astarta boops, 125; stigma, 51
 Bracon simplex, 128
 Cælixys mandibularis, 125, 126, 173
 Callirhytus semicarpifoliae, *Cam., 38
 Camponiscus luridiventris, 225
 Charitojoppa, 179

Chrysis abuensis, *Nurse, chavanæ, *
 Nurse, 307; jalala, *Nurse, 306; kash-
 mirensis, *Nurse, 307; lepcha, *Cam.,
 206; quærata, *Nurse, 307; viridula, 79
 Cleptes pallipes, 78
 Colganta, *Cam., 20; fulgidipennis,
 fulvipennis, 22; nigromaculata, *
 Cam., rufipes, *Cam., 21; tarsalis,
 tibialis, tuberculata, 22
 Colletes cunicularia, 51, 126
 Crabro palmarius, 78
 Cryptojoppa, 110
 Dasypoda hirtipes, 125
 Echthrus, 18
 Ellampus cæruleus, 79; timidus, *
 Nurse, 305
 Habrojoppa, *Cam., 179; rufopetiolata, *
 Cam., 179
 Halictus atricornis, 51

Hedychridium perversum, * *Nurse*, 306 ;
roseum, 79, 125 ; *selectum*, * *Nurse*, 306
Holcojoppa, * *Cam.*, 180 ; *flavipennis*, *
Cam., 181
Holopyga cupreata, * *Nurse*, 305
Ichneumon, 20 ; *ælvanus*, 108
Lino ceras, 183
Magrettia, 179
Melissodes assimilis, *intorta*, *malvina*, *
Cock., *personatella*, *sphæralcæ*, *tristis*, 177
Melittia caudatum, *ceto*, 198
Mutilla æsyca, * *Cam.*, 208 ; *casiphia*, *
Cam., 207
Nomada fucata, 125
Notozus kashmirensis, * *Nurse*, 305
Nyssa dimidiatus, 78
Ecophylla smaragdina, 153, 202
Osmia inermis, 51 ; *leucomelana*, 28 ;
parietina, *xanthomelana*, 51, 173
Osprynchotus peronatus, * *Cam.*, 182
Oxybelus mucronatus, 51

Pompilus approximatus, 51 ; *cinctellus*,
175 ; *setabis*, * *Cam.*, 240
Salius flavus, *himalayensis*, * *Cam.*, 240
Selandria atra, 52
Stelis aterrima, 175
Tetrachrysis, 206
Tiphia bicarinata, * *Cam.*, 239 ; *curvinervis*, *
Cam., *fulvinervis*, 238 ; *spinosa*, *
Cam., 237
Torbda, * *Cam.*, 18 ; *apicalis*, * *Cam.*,
19 ; *femorata*, * *Cam.*, 18-20 ; *fulgidipennis*,
Cam., *geniculata*, * *Cam.*, 19 ; *maculipennis*, *
Cam., 19, 21 ; *violaceipennis*, * *Cam.*, 19, 20
Trypoxylon figulus, 125 ; *geniculatum*, *
Cam., 313 ; *trochanterum*, * *Cam.*, 313
Vespa austriaca, 51 ; *germanica*, 126 ;
vulgaris, 124, 126, 291
Xenojoppa, * *Cam.*, 179
Zethus chalybeus, 291 ; *quadridentata*, *
Cam., 314

LEPIDOPTERA.

Abraxas grossulariata, 12, 120, 121, 150,
198, 270, 289 ; *ulmata*, 26
Abrostola triplasia, 26 ; *urticæ*, 26
Acherontia atropos, 15, 43, 46, 76, 116
Achroæa grisella, 13
Acidalia aversata, 7, 12, 77, 78, 289 ;
bisetata, 12, 46, 289 ; *contiguaria*, 14,
331 ; *dilutaria*, 289 ; *dimidiata*, 12,
289 ; *emarginata*, 46 ; *fumata*, 47 ;
imitaria, 4, 12, 289 ; *incanaria*, 4 ;
marginepunctata, 12, 51, 52, 124, 156,
175, 219, 247, 289 ; *ornata*, 247 ;
promutata, 7, 46 ; *remutaria*, 12 ;
rubiginata, 46, 331 ; *rubricata*, 4, 331 ;
subsericeata, 12, 52 ; *trigeminata*, 3,
46 ; *virgularia*, 4, 289
Acipitilia pentadactyla, 13
Acontia luctuosa, 196 ; *urania*, 31
Acræa alicia, 279 ; *astrigera*, 309 ; *baxteri*, *
40 ; *bonasia*, 67, 279 ; *cabira*,
280 ; *cæcilia*, 66, 67, 280, 308 ; *dice*,
280 ; *egina*, 309 ; *insignis*, 41, 280 ;
lycia, 67, 309 ; *natalica*, *neobule*, 280 ;
ochrascens, * 41 ; *peneleus*, 280 ; *perenna*,
309 ; *pharsalus*, 309 ; *pomponia*,
280 ; *pseudegina*, 67 ; *pudorina*, 280 ;
serena, 41, 67, 279 ; *sykesi*, * 279 ;
vinidia, 67, 279 ; *zetes*, 66, 309
Acrocercops brongniardellum, 164
Acronycta aceris, 289 ; *alni*, 116, 269 ;
leporina, 46 ; *megacephala*, 26, 289 ;
menyanthidis, 26, 328 ; *psi*, 46, 192,
289 ; *rumicis*, 270
Acropteris angulataria, 107
Adopæa actæon, *linea*, *lineola*, 30 (see
also *Hesperia*)
Aglais urticæ, 50, 173, 328 (see *Vanessa*)
Agriopis aprilina, 11, 27, 31, 269, 290

Agrotis agathina, 149, 290, 331 ; *aquilina*,
46 ; *ashworthii*, 14 ; *cinerea*, 322 ;
corticea, 10, 46, 247, 270, 289, 293 ;
exclamationis, 46, 247, 270, 288, 289 ;
fumosa, 10 ; *lucernea*, 10 ; *lunigera*,
288, 289 ; *nigricans*, 5, 10, 46, 289 ;
obelisca, 10, 269, 288 ; *puta*, 46, 121,
269, 270 ; *ripæ*, 5, 271, 331 ; *saucia*,
27 ; *segetum*, 27, 46, 124, 247, 289 ;
strigula, 10 ; *suffusa*, 27, 46, 270, 289 ;
tritici, 5, 10, 46, 50, 149, 288 ; *valligera*,
46, 270 ; *vestigialis*, 5
Alpenus æqualis, 105
Alucita hexadactyla, 13
Amauris damocles, *enceladus*, 278
Amblyptilia acanthodactyla, 13
Ambulyx ganascus, *rostralis*, 50 ; *strigilis*,
31
Amorpha austanti, *populi*, 333
Amphidasys betularia, 4, 12, 26, 72, 75,
78, 121, 150, 197, 218, 221, 271, 289 ;
doubledayaria, 4, 121, 150, 197 ; *prodromaria*,
145, 289 ; *strataria*, 11, 174, 269
Amphipyra pyramidea, 5, 10, 46, 120 ;
tragopogonis, 10, 46, 120, 270
Ampittia inornatus, 105
Anaitis plagiata, 26, 146, 289
Anarta myrtilli, 11, 288, 289
Anchocelis litura, 27, 46 ; *lunosa*, 10,
46, 117 ; *pistacina*, 10, 46 ; *rufina*,
27, 50, 290
Angerona prunaria, 327
Anisopteryx æscularia, 12, 26, 144, 145,
174
Antheræa astrophela, 143 ; *eucalypti*,
heleneæ, *janetta*, *loranthi*, *simplex*,
16

- Anticlea badiata*, 13, 26, 170; derivata, 170; nigrofasciata, 170, 171; rubidata, 289
Anthocharis belemia, 61; belia, 62; cardamines, 197; charlonia, 62; damone, 62; glauce, 61; penia, 62
Anthrocera filipendulæ, 246; trifolii, 50, 246, 271
Antithesia salicella, 6, 133, 220
Apamea basilinea, 46; didyma, 289; fibrosa, 46; gemina, 46, 247, 270; oculea, 46, 270; ophiogramma, 4, 267, 271; remissa, 46; testacea, 150, 175
Apatura ilia, 96; iris, 96, 245
Aphantopus hyperanthus, 119, 325
Aphelia osseana, 211
Aphnæus lazularia, lohita, 202
Aphomia sociella, 13
Aphysoneura pigmentaria, 278
Aplecta advena, 4, 46; herbida, 290; nebulosa, 11, 46, 247, 289; prasina, 11
Aporia cratægi, 93, 94, 241, 243, 245
Arctia caia, 120, 269; hospita, 150; lubricipeda, 150; plantaginis, 150; urticæ, 150; villica, 3, 116, 194, 247
Argina cingulifera, 105
Argynnis adippe, 1, 5, 50, 75, 93, 94, 118, 245, 288; aglaia, 1, 30, 75, 93, 118, 145, 245, 288, 292; chlorodippe, 50; dia, 97, 245; eris, 94, 99; euphrosyne, 75, 94, 118, 173, 245, 288, 290, 326; latonia, 50, 94, 230, 245; niobe, 94, 99, 245; pales, 94; paphia, 30, 50, 93, 97, 99, 118, 242, 291; selene, 75, 97, 118, 173, 245, 326; valesina, 50, 97 (see also *Brenthis*)
Argyresthia, 161
Argyrolepis æneana, badiana, baumanniana, enicana, 211; hartmanniana, 14; maritima, subaumanniana, zephyrana, 211
Argyrophorus argenteus, 222
Argyrotoxa audouinana, 132; conwayana, 13, 132
Asphalia diluta, 117, 144; flavicornis, 145; ridens, 293
Aspilates citraria, 46, 52; gilvaria, 270; ochrearia, 52
Aspis udmanniana, 13, 134
Asthena blomeri, 326; candidata, 3, 247; luteata, 3; pulchraria, 26
Atella columbia, 309; phalantha, 67, 309
Audea subligata,* 212
Augiades comma, 97, 329; sylvanus, 30
Aventia flexula, 143
Axiocerses perion, 102
Axylia putris, 46, 269
Azygophleps inclusa, 107; leopardina,* 213
Bactra furfurana, 169; lanceolana, 14, 169
Bankia argentula, 115
Baoris fatuellus, netopha, 105
Bapta binaculata, 171; temerata, 3, 171
Batodes angustiorana, 188, 244
Bedellia, 161
Belenois abyssinicus, calypso, creona, gidica, mesentina, 103
Biston hirtaria, 175
Boarmia cinctaria, 12, 171, 223; gemmaria, 272, 289; repandata, 12, 31, 50, 289, 330, 331
Bohemannia quadrimaculella, 272
Bombycomorpha bifascia, 77
Bombyx neustria, 4, 120; quercus, 47, 120, 171; rubi, 24, 120; trifolii, 328 (see also *Lasiocampa*, *Macrothylacia*, and *Malacosoma*)
Bomolocha fontis, 11
Botys fuscalis, 13; pandalis, 247; ruralis, 13
Brenthis selene, 50 (see *Argynnis*)
Brephos notha, 175; parthenias, 145, 175
Bryophila glandifera, 30; muralis, 30, 51, 52; perla, 31
Bucculatrix, 161
Bupalus piniaria, 12, 26, 117, 171, 289
Burnea christyi, phædusa, pygmæa, 106
Byblia götzius, 68; lithyia, 310
Cabera exanthemata, 12, 289; pusaria, 12, 247, 289
Cacyreus lingens, 102
Calamia lutosa, 46; phragmitidis, 46, 270
Caligo, 223
Calligenia miniata, 5
Callimorpha dominula, 246, 270; hera, 52, 269; quadripunctaria, 52
Callophrys rubi, 229, 324
Calocampa exoleta, 11, 27, 31, 195; vetusta, 11
Calymnia diffinis, 287; trapezina, 10, 270, 330
Cameraria guttifinitella, 164
Campptogramma bilineata, 13, 50, 116, 247, 289; fluviata, 13
Capua favillaceana, 14, 169
Caradrina alsines, 289; ambigua, 52; blanda, 46; cubicularis, 46; exigua, 52; morpheus, 46, 289; taraxaci, 289
Carcharodus alceæ, 231; lavatera, 94
Carpocapsa grossana, juliana, nimbana, 191; pomonella, 4, 191
Carsia imbutata, 51; paludata, 56
Carterocephalus palæmon, 245
Catachroptera cloantha, 310
Cataclysta lemnata, 6, 247
Catocala conversa, 195; electa, 196; elocata, 195; fraxini, 120; nupta, 6, 46, 120, 121; promissa, 290; sponsa, 121, 171, 290
Catochrysops fumosus, osiris, 102
Catopsilia crocale, 148; florella, 104
pomona, 148

- Catoptria æmulana*, 209; *albersana*, 193; *cana*, 14, 209; *cæsimaculana*, 209; *citrana*, 14, 209; *expallidana*, 209; *hypericana*, 14, 193; *scopoliana*, *tripoliana*, 209; *ulicetana*, 14, 193; *wimmerana*, 208
Celæna haworthii, 51, 146
Cemiosoma, 159
Cephonodes hylas, 173
Cerastis erythrocephala, 29, 323; *ligula*, 269; *spadicea*, 46, 269; *vaccinii*, 10, 27, 46, 170, 269
Cerigo cytherea, 5, 23, 46; *matura*, 289
Cerostoma costella, *radiatella*, *sylvella*, *vittella*, 7
Cerura bifida, 269; *swierstræ*,* 213; *vinula*, 5, 246, 269
Cherocampa celerio, 46, 195, 196, 287; *elpenor*, 120, 196, 290, 329; *porcellus*, 247
Charæas graminis, 46, 128, 146, 326
Charagia cyanochlora, *daphnandri*, *mirabilis*, *ramsayi*, *scotti*, *splendens*, 73
Charaxes achæmenes, 68; *castor*, *epiasius*, *etesipe*, *etheocles*, 311; *jasius*, 174, 195; *kirkii*, *lichas*, *numenes*, *pollux*, *tiridates*, 311; *varanes*, 68, 311; *viola*, 68
Chalciope carnieola, 212; *pretoriæ*,* 212
Chariclea delphinii, 25; *umbra*, 11
Charidea cauta, 107
Chelaria hübnerella, 7
Chelonia plantaginis, 26; *villica*, 290
Cheimatobia brumata, 12, 76, 290
Chilena sp., 106
Chilo phragmitellus, 46
Chrosis audouinana, *bifasciana*, 244; *tesserana*, 210
Chrysophanus aleiphron, 94; *dispar*, 245, 321, 331; *gordius*, *hippothoë*, 94; *phleas*, 2, 119, 121, 195, 229, 246, 270, 289, 324
Cidaria associata, 289; *corylata*, 13, 26, 330; *dotata*, 26; *fulvata*, 4, 27; *immanata*, 13, 146, 289; *miata*, 7, 13, 146; *populata*, 13, 26; *prunata*, 13; *pyraliata*, 26; *ribesiarum*, 26; *russata*, 146; *siderata*, 13; *suffumata*, 13, 330; *testata*, 13, 26; *truncata*, 13, 247
Cimola eleuteria, 106
Cirr hædia xerampelina, 10
Cledeobia angustalis, 5
Cleora glabraria, 149, 289; *lichenaria*, 12, 149, 171, 270, 289
Cloantha solidaginis, 27
Cnephasia musculana, 13, 168; *pascuana*, 320; *pasivana*, 195, 265; *sinuana*, 194, 265, 320
Cnethocampa processionea, 77
Coccyx argyræna, 14, 190; *hyrciniana*, *nigricana*, *splendidulana*, *strobilana*, 190; *tædella*, 14
Cœnonympha arcania, 94, 328, 329; *darwiniana*, 94; *davus*, 47, 145, 246, 331; *pamphilus*, 75, 230, 231, 246, 270, 289, 325; *rothliebi*, 331; *typhon*, 115, 145, 331
Coleophora anatipennella, 3; *limosipennella*, 3
Colias edusa, 3, 47, 48, 50, 76, 93, 94, 115, 118, 196, 197, 200, 228, 229, 230, 231, 244, 245, 266, 270, 285, 286, 322, 325; *helice*, 231, 285; *hyale*, 28, 47, 50, 74, 75, 93, 94, 95, 115, 118, 197, 245, 270, 285; *palæno*, 95; *pyrenaica*, 230; *vautieri*, 222
Conchylis dilucidana, 5, 211; *dipoltella*, *francillonana*, *smeathmanniana*, 211; *stramineana*, 14, 211
Coremia ferrugata, 13, 50; *munitata*, 146; *quadrifasciaria*, 5; *unidentaria*, 13
Coriscium brongniardellum, *culcipennellum*, *sulphurellum*, 139
Cosmia affinis, 46; *diffinis*, 75; *trapezina*, 46, 50, 290 (see also *Calymnia*)
Cosmotriche potatoria, 332
Cossus ligniperda, 3, 120, 144, 197, 269, 270, 293, 331
Crambus contaminellus, 5; *geniculeus*, 6, 13; *hamellus*, 331; *inquinatellus*, 3, 13; *perlellus*, 13; *pinetellus*, 5, 6; *pratellus*, 13; *tristellus*, 13; *warringtonellus*, 331
Crenis natalensis, *occidentalium*, 310
Crinopteryx ganciliella, 124
Crocallis elinguarum, 6, 120
Cucullia absinthii, 11; *umbratica*, 11, 247, 288, 289; *verbasci*, 11, 246, 247
Cupido minima, 246, 327
Cyaniris argiolus, 43, 44, 75, 171, 231, 246, 266, 324, 328 (see also *Lycæna*)
Cyclopides puelmæ, 222
Cyligramma limacina, 107
Cymatophora duplaris, 50, 329; *flavicornis*, 26, 175, 290; *octogesima*, 220, 329; *ocularis*, 46, 220, 269; *ridens*, 290
Cymothoe lurida, 311
Danais alcippus, 66, 278; *chrysippus*, 99, 278; *dorippus*, 278; *erippus*, 245; *klugii*, 278; *petiverana*, 66
Dasyampa rubiginea, 50, 118, 322
Dasychira pudibunda, 78, 326; *remota*, 106; sp. 106 (see also *Orgyia*)
Dasypolia templi, 118
Deilephila euphorbiæ, 151; *galii*, 287; *livornica*, 287, 322
Deiopeia pulchella, 195, 196
Depressaria costosa, *litorella*, *subpropinquella*, 6
Diacrisia lutescens, 105
Dianthœcia barretti, 10; *cæsia*, 10, 271; *capsincola*, 10, 47, 247; *capsophila*, 10; *conspersa*, 150, 247, 330; *cucubali*, 10; *ficlini*, 50, 79; *luteago*, 10, 50, 79; *nana*, 10, 330
Dichelia grotiana, 13, 131

- Dicrorampha acuminatana*, 192; *alpestrana*, 192; *alpinana*, 14, 192; *consortana*, 192; *flavidorsana*, 145; *herbosana*, 14; *petiverella*, *plumbagana*, 192; *politana*, 3, 192; *simpliciana*, 192
Dictyopteryx bergmanniana, 132; *contaminana*, 7; *forskaleana*, 132; *holmiana*, 132; *loeflingiana*, 13, 132
Dicycla oo, 51, 267, 287
Dilina populi, 198; *tiliæ*, 24
Diloba cæruleocephala, 7
Dimorpha versicolora, 333
Diphthera orion, 290
Dipterygia pinastri, 3, 5, 46, 269; *scabriuscula*, 3, 288, 289
Titula hartmanniana, 132; *semifasciana*, 132, 220
Diurnea fagella, 145
Doritis apollinus, 61
Drymonia chaonia, 329
Duomitus squameus, * 213
Ebulea crocealis, 13, 247; *stachydalis*, 244; *verbascalis*, 5, 6
Ellophia fasciaria, 171; *prosapiaria*, 11, 171, 289
Elymnias bammakoo, 41; *phegea*, 41; *rattrayi*, * 41
Ematurga atomaria, 12, 171, 294
Emmelesia affinitata, 26; *albulata*, 12, 146; *alchemillata*, 4, 12, 26; *decolorata*, 4; *ericetata*, 146; *unifasciata*, 12
Emydia cribrum, 289
Endopisa nigricana, 191
Endotriche flammealis, 45
Endromis versicolor, 120, 149
Ennomos angularia, 51, 120; *erosaria*, 322; *fuscantaria*, 121; *tiliaria*, 269
Ennychia octomaculata, 13
Entomogramma pardus, 107
Epermenia, 160
Ephestia elutella, 4; *kühniella*, 13
Ephippiphora bimaculana, 7, 189; *brunnichiana*, 14, 189; *feneana*, 189; *gallicolana*, 190; *inopiana*, 189; *pflugiana*, 14, 189; *populana*, 190; *signatana*, *tetragonana*, 189; *trigeminana*, 14, 189
Ephyra pendularia, 275; *punctaria*, 3, 6; *omicronaria*, 6
Epinephele hyperanthus, 119, 245; *ianira*, 2, 26, 100, 119, 230, 231, 245, 246, 270, 288, 325; *ida*, 230, 231; *jurtina*, 325; *lycaon*, 94, 100; *pasiaphaë*, 230; *telemisssa*, 100; *tithonus*, 119, 245, 270, 289, 325
Epione apiciaria, 5, 11
Epunda lutulenta, 50, 118; *viminalis*, 6
Erastria fasciana, 11
Erebia adyte, 89, 97; *æthiops*, 29, 97, 241, 245; *ajanensis*, 90; *cassiope*, 8, 97, 331; *christi*, 272; *epiphron*, 97, 245; *euryale*, 42, 89, 94, 97; *goante*, 95; *leucotænia*, 97; *ligea*, 89, 94, 245; *livonica*, 89; *melampus*, 89, 94; *mnestra*, 97; *ocellaris*, 90; *sedetica*, 89; *tyndarus*, 89, 94; *zapateri*, 272
Eremobia ochroleuca, 270
Ergolis enotrea, 310
Eriocrania subpurpurella, 175
Eriogaster lanestris, 174
Eriopsela fractifasciana, 168
Eubolia bipunctaria, 27; *cervinaria*, 7, 246; *cervinata*, 120, 331, 332; *limitata*, 13, 289; *mensuraria*, 27, 146; *plumbaria*, 13, 289
Euchelia jacobææ, 6, 116, 120, 144, 173, 288, 289, 293
Euchloë beleimia, 229, 230; *belia*, 93, 229, 230; *cardamines*, 2, 26, 75, 93, 118, 229, 245, 324, 325; *euphenoides*, 229, 230; *glauca*, 229; *simpsonia*, 93; *tagis*, 229
Euchloris bajularia, *pustulata*, 150
Euchromia purpurana, 167
Euchrysops nigeriæ, * 102
Euclidia glyphica, mi, 120, 247
Eucosmia undulata, 13
Eudorea cembræ, 6
Eugonia alniaria, 6, 11; *quercinaria*, 11; *tiliaria*, 6 (see *Ennomos*)
Eugonia polychloros, 121 (see *Vanessa*)
Euphædra crockeri, *crossei*, *janetta*, *themis*, 68; *uganda*, 311
Eupisteria heparata, 26
Eupithecia abbreviata, 12, 170, 171; *absinthiata*, 12; *albipunctata*, 12; *assimilata*, 12; *castigata*, 12, 289; *centaureata*, 6; *consignata*, 149; *coronata*, 6, 12, 171; *constrictata*, 12; *debiliata*, 12; *fraxinata*, 4; *indigata*, 12; *irriguata*, 171, 290; *jasionæata*, 12, 268; *lariciata*, 12; *minutata*, 289; *nanata*, 12, 47, 171; *oblongata*, 4, 12; *plumbeolata*, 12; *pumilata*, 4, 12, 171, 289; *pygmæata*, 12; *rectangulata*, 12, 247; *satyrata*, 12; *scabiosata*, 12; *sobrinata*, 4; *subfulvata*, 12; *subnotata*, 4, 289; *succenturiata*, 4, 75; *tenuiata*, 12, 173, 289; *togata*, 12; *trisignaria*, 197; *valerianata*, 12; *venosata*, 12, 26; *virgaureata*, 12; *vulgata*, 12
Euplexia lucipara, 11, 46, 289, 290
Eupeclia affinitana, *angustana*, 210; *atricapitana*, 6, 209; *ciliella*, 14, 210; *dubitana*, 209; *erigerana*, 210; *gilvicomana*, 123; *hybridellana*, *implicitanana*, 210; *maculosana*, *nana*, 209; *notulana*, 210; *pallidana*, 14; *roseana*, *rupicola*, *udana*, *vectisana*, 210
Euprepia pudica, 196
Eurhyphara urticata, 13, 247
Eurymene dolabraria, 11, 330
Eurymus croceus, 200
Euryphe theognis, 311

- Eurytela dryope*, 310; *hiarbas*, 242; *ophione*, 310
Euvanesa antiopa, 50, 151
Euxanthe ansellica, *crossleyi*, 311
Euzophera pinguis, 4, 265
Exæretia allisella, 331
Fidonia atomaria, 328
Gastropacha ilicifolia, 332; *quercifolia*, 269
Gegenes hottentota, 105; *letterstedti*, 105
Gelechia desertella, 5; *mulinella*, 6, 145; *semidecandrella*, 145; *senectella*, 6
Geometra papilionaria, 5, 12, 52; *vernaria*, 120
Glottula fusca, 77
Glutophrissa saba, 103
Glyphodes sinuata, 107
Gnophos obfuscata, 146; *obscuraria*, 12, 289
Gnophria quadra, 149, 171
Gonepteryx cleopatra, 229, 301; *rhamni*, 3, 26, 56, 75, 93, 94, 118, 144, 145, 170, 230, 245, 284, 290, 301, 323
Gonometa christyi,* 106; *postica*, 77
Gonoptera libatrix, 11, 27, 46, 289
Gracilaria omisella, *swederella*, *syringella*, 139
Grammesia bilinea, 290; *trigrammica*, 247, 290; *trilinea*, 26, 46, 290
Grammodes algira, *bifasciata*, 196
Graphiphora cerasi, 200
Grapholitha campoliliana, *cinerana*, *minutana*, 188; *nævana*, 14, 188; *nigromaculana*, 14, 188; *nisella*, 14, 169; *obtusana*, 188; *paykulliana*, 169; *penkleriana*, 7, 14, 188; *trimaclulana*, 14, 188
Gynaniza maia, 77
Habrostola tripartita, 11, 289; *triplassia*, 11, 26; *urticea*, 26
Hadena advena, 46, 247; *chenopodii*, 46, 247; *dentina*, 11, 46, 76, 247, 288, 289; *genistæ*, 46, 247, 289; *glauca*, 26; *oleracea*, 46, 247, 289; *protea*, 46, 223; *proteus*, 27; *suasa*, 46; *thalassina*, 11, 46; *trifolii*, 289
Halia vaularia, 26
Halias bicolorana, 171; *prasinana*, 3
Halonota cirsiana, 3; *fœnella*, 4; *similana*, 7
Hamanumida dædalus, 68, 310
Harpella bracteella, 75; *geoffrella*, 3
Harpiteryx xylostella, 5
Hecatera serena, 4, 11, 46, 247, 288, 289
Hedya aceriana, 133; *dealbana*, 13, 133; *lariciana*, 133, 220; *neglectana*, *ocellana*, *pauperana*, *servillana*, 133
Heimene fimbriana, 190
Heliconius antiochus, *lindigii*, 198, 292; *telchinia*, 29
Heliothobus popularis, 6
Heliothis armigera, 52, 118; *dipsacea*, 288, 289; *dipsaceus*, 149; *peltigera*, 11
Hemaris bombylifformis, 120; *fuciformis*, 289, 334; *hyas*, *janus*, *kingii*, 185
Hemerophila abruptaria, 196
Hemithea strigata, 12, 150, 289; *thymaria*, 150
Henucha smilax, 77, 106
Hepialus hectus, 289; *hethlandica*, 170; *humuli*, 118, 170, 289; *lupulinus*, 247; *sylvanus*, 6; *thulensis*, 170
Herbula cespitalis, 5, 13
Herminia tarsipennalis, 5
Hesperia actæon, 245, 288, 289; *comma*, 97, 119, 325; *dromus*, 105; *linea*, 270; *lineola*, 245; *malvæ*, 324, 325; *nostrodamus*, 100, 196; *sao*, 231; *sylvanus*, 119, 246, 289, 325, 326; *thauamas*, 119, 325; *zelleri*, 195
Heterogynis paradoxa, 292
Heteropterus morpheus, 293
Himera pennaria, 11, 46, 289, 322
Homœsoma binævella, 13; *nebulella*, 4; *sinuella*, 3, 5
Hybernia defoliaria, 12, 50; *fuscata*, 223; *leucophæaria*, 144, 148, 330
marginaria, 12, 50, 145, 170, 223, 330; *progemma*, 26
Hybocampa dryinopa, 292, 293; *milhauseri*, 292
Hyboma strigosa, 149
Hydriomena fuscata, 328
Hydrocampa stagnalis, 4
Hydrocæia micacea, 27, 46, 269; *nictitans*, 27, 46, 270
Hygrochroa syringaria, 221
Hyloicus pinastri, 120
Hylophila bicolorana, *quercana*, 330
Hypanartia delius, *hippomene*, 309
Hypena proboscidalis, 11, 289
Hypermezia angustana, 188
Hypocala plumicornis, 107
Hypolimnas anthedon, 311; *misippus*, 68, 310; *monteironis*, 311
Hypolycæna phorbæ, 154
Hyponomeuta padellus, 6
Hypotia corticalis, 78, 123
Hypsa substracta, 73
Hypsiphus marginellus, 328
Hypsipetes impluviata, 26, 330; *rubidata*, 26; *sordidata*, 13, 289, 328, 330; *trifasciata*, 13
Hyria anroraria, 47, 149
Idmais fausta, 62
Iodis lactearia, 12; *vernaria*, 4, 75
Iphiclidæ podalirius, 219
Jocheara alni, 149 (see *Acronycta*)
Junonia boöpis, 67, 309; *cebrene*, *celia*, 67, 309; *westermanni*, 309
Kallima, 50
Lachnocnema d'urbani, 101
Lælia setinoides, 106
Lampides bæticus, 221; *hippocrates*, 102

- Lasiocampa callunæ*, 150; *lanestris*, 48; *rubi*, 116; *quercifolia*, 244; *quercus*, 47, 51, 120, 150, 246, 293, 332
Larentia autumnalis, 330; *cæsiata*, 26, 146; *didymata*, 12, 146; *flavicinctata*, 56; *multistrigaria*, 12, 26, 50, 148, 289; *pectinitaria*, 146; *unangulata*, 330; *viridaria*, 12
Leioptilus osteodactylus, 6; *tephradactylus*, 13
Leptidia diniensis, 95; *sinapis*, 93, 94, 95, 230
Leptogramma literana, 13; *scabrana*, 13
Leucania albipuncta, 52, 293; *comma*, 46, 247, 289; *conigera*, 4, 48, 289; *impura*, 46, 196, 270, 289; *lithargyria*, 4, 46, 196, 270; *obsoleta*, 270; *pallens*, 46, 247, 270, 289; *straminea*, 46; *turca*, 291
Leucanitis stolidia, 196
Leucanthiza ostensackenella, 164
Leuceronia argia, 104; *pharis*, 104
Leucophasia æstiva, 62; *duponcheli*, 62; *sinapis*, 50
Leucophlebia afra, 105
Leucoptera, 159
Ligdia adustata, 170
Limenitis camilla, 94; *populi*, 96, 97, 327; *sibylla*, 5, 93, 94, 171, 288, 289
Liparis auriflua, 26, 116, 289; *chrysorrhœa*, 116; *monacha*, 289; *salicis*, 4, 116
Liphyra brassolis, 153, 184, 202, 223, 225, 252
Lipoptycha plumbana, 193
Lithocolletis, 161; *corylifoliella*, *stettinensis*, 140
Lithosia deplana, 288, 289, 327, 328; *helvola*, 149; *lurideola*, 288, 289; *mesomella*, 223; *ochreatea*, 328; *molybdeola*, 270; *quadra*, 289; *rubricollis*, 290; *sericea*, 50, 333; *sorocula*, 328
Lobesia permixtana, 209
Lobophora viretata, 13
Lomaspilis marginata, 12, 26, 247, 289
Lophopteryx camelina, 46
Luperina cespitis, 6; *dumerili*, 25; *testacea*, 270
Lycæna acis, 245, 329; *admetus*, 30, 50, 98; *adonis*, 119, 246; *ægidion*, 95; *ægon*, 47, 94, 119; *agestis*, 119, 270, 246; *albicans*, 30; *alcon*, 96; *alexis*, 270; *alsoides*, 243; *alsus*, 325; *anteros*, 98; *antiochena*, 98; *argiolus*, 5, 43, 44, 75, 119, 171, 196, 246, 266, 270, 286; *argus*, 94, 95, 327; *arion*, 51, 94, 119, 245, 325; *astrarche*, 229, 231, 324; *balcanica*, 97; *baton*, 96; *bellargus*, 94, 98, 218, 230, 324; *bœtica*, 195, 230, 249; *corydon*, 2, 30, 93, 94, 96, 98, 119, 246, 273, 284, 292, 294, 321, 325, 328; *corydonius*, 30, 96, 98; *crassipuncta*, 98; *damon*, 29, 30, 78, 93, 94, 98; *dolus*, 29, 30, 48, 50; *escheri*, 96; *eros*, 94; *eumedon*, 94; *galba*, 98; *gamra*, 97; *hispana*, 30; *hylas*, 30, 78, 94, 292; *icarinus*, 96; *icarus*, 75, 93, 94, 96, 119, 218, 221, 229, 231, 246, 289, 324, 326, 327, 333; *isaurica*, 98; *loewii*, 98; *lorquini*, 230, 231; *lycidas*, 95; *lysimon*, 98; *melanops*, 231; *meleager*, 29, 96; *minima*, 231, 243, 246, 294, 327; *minimus*, 94; *nicholli*, 98; *nivescens*, 30; *orbitulus*, 96; *obscura*, 94; *pheretes*, 96; *polonus*, 98; *poseidon*, 98; *rippertii*, 30, 50, 98; *sebrus*, 231; *semiargus*, 94, 98, 99, 329; *syngnatha*, 274; *telicanus*, 195; *trochylus*, 98; *vittata*, 29, 30, 50; *zephyrus*, 95, 98
Lycænesthes adherbal, 102; *amarah*, 102; *larydas*, 102
Lygris populata, 330
Lymantria monacha, 120, 328
Lyonetia, 159
Macaria fuscata, 116; *litrata*, 12, 116, 124, 149, 289; *nigrofulvata*, 116, 124, 149; *notata*, 3, 7
Macroglossa bombylifformis, 290; *fuciformis*, 290; *stellatarum*, 26, 76, 116, 120, 149, 196
Macrothylacia rubi, 24, 78, 120, 290, 332
Malacosoma alpicola, 122; *castrensis*, 121, 222; *franconica*, 222; *neustria*, 76, 120, 122, 148, 222, 246, 289
Mamestra abjecta, 46; *albicolon*, 247; *anceps*, 46, 247; *brassicæ*, 46, 73, 76, 247, 270, 289; *mutans*, 57; *persicariæ*, 46; *serena*, 330; *sordida*, 289
Mania maura, 10, 46, 120, 269, 270; *typica*, 10, 46, 50, 196
Melanargia cleante, 29; *galatea*, 93, 119, 270, 288; *herta*, 99; *iapygia*, 29; *larissa*, 99; *syllius*, 231; *titea*, 99
Melanchra mutans, 57
Melanippe fluctuata, 13, 289; *galiata*, 13, 26, 78, 247, 289; *montanata*, 13, 247, 326; *obscurata*, 31; *procellata*, 289; *rivata*, 289; *sociata*, 13, 31, 50, 289; *subtristata*, 247; *tristata*, 26; *unangulata*, 289, 330
Melanitis leda, 278; *solandra*, 66
Melanthia albicillata, 13, 26, 289, 326; *bicolorata*, 13, 289; *ocellata*, 13, 26, 146, 247, 289; *rubiginata*, 26
Melitæa ætheria, 230; *alpina*, 97; *athalia*, 50, 93, 94; *arduinna*, 99; *artemis*, 75; *aurinia*, 27, 75; *cinxia*, 50, 245, 324; *dictynna*, 94; *didyma*, 30, 93, 94, 97, 99, 245; *neera*, 99; *occitanica*, 97, 231; *phœbe*, 93, 94, 97, 231
Mellinia citrago, *gilvago*, *ocellaris*, 25

- Mesogona oxalina*, 252
Mesotype lineolata, virgata, 288
Metanastria contraria, 106
Metarectia rufescens, 77
Metopsilus porcellus, 330
Metrocampa margaritaria, 11, 120, 171, 247, 289
Miana bicoloria, 289; fasciuncula, 26, 46, 146, 247; furuncula, 270; strigilis, 46, 247, 289, 290
Mimæoptilus bipunctidactyla, 13; fuscus, 6; pterodactylus, 13
Misela capucina, 50; oxyacanthæ, 11, 27, 46, 50, 171
Morpho achilles, 292; cypris, 223
Musgravia leighi, 291
Mycalesis angulosa, 278; desolata, 66, 278; funebris, miriam, perspicua, 278; safitza, 66; saussurei, 278; vulgaris, 66
Mylois cribrella, 150; cribrum, 4, 150
Mylothris chloris, 103
Nebroda albimaculata, 278
Nemeobius lucina, 119, 246, 324, 325
Nemeophila russula, 47
Nemoria viridata, 289
Nephele variegata, 321
Nephopteryx splendidella, 13
Nepticula, 159
Neptidopsis ophione, 68
Neptis agatha, 68, 242, 310; mapessa, 310; melicerta, 68
Neolycaena cissius, 102
Neuria reticulata, 247; saponariæ, 46, 47
Nisoniades marloyi, 100; tages, 246
Noctua augur, 10, 46, 146, 196; baia, 5, 196, 270; brunnea, 10, 46, 150; c-nigrum, 46, 196, 270, 287; dahlii, 10; festiva, 10, 14, 46, 196; glareosa, 10, 27, 150; neglecta, 290, 330; plecta, 10, 27, 46; rhomboidea, 46; rubi, 10, 46, 146; sobrina, 121; triangulum, 10, 46, 196, 289; umbrosa, 10, 46; xanthographa, 10, 46, 50, 270
Nola albulalis, 27; cucullatella, 171; confusalis, 46; strigula, 149, 171, 289
Nomophila noctuella, 13
Nonagria lutosa, 323; neurica, 46; sparganii, 27
Notodonta carmelita, 172; chaonia, 290; dictæa, 6, 116, 120, 172, 269; dictæoides, 172, 330; dromedarius, 172, 269; dryinopa, 42, 193, 292, 293; trepida, 329
Nudaria mundana, 26; senex, 4
Nudaurelia jebbæ, 106; menippe, 77
Nychitoma alcesta, 103
Nyssia hispidaria, 50, 149, 174
Odonestis potatoria, 16, 117, 241, 269, 289
Odontopera bidentata, 11, 26, 46, 50
Oecogenia kindermanniella, quadri-puncta, 6
Oecophora sulphurella, 78
Edematophorus lithodactylus, 13
Olinda ulmana, 190
Oncocera ahenella, 244
Opadia funebrana, 191
Ophiodes lunaris, 25, 51, 74
Ophisma indicabilis, 107
Ophiusa melicerte, 107
Oporabia autumnata, 26; dilutata, 12, 171; filigrammaria, 26
Orobene straminealis, 13
Oreopsyche leschenaulti, 293
Orgyia antiqua, 175; pudebunda, 3, 150 (see *Dasychira*)
Ornithoptera bormanni, 174; cassandra, 17, 185; criton, 174; lydeus, 149; naias, plateni, 174; richmondi, 17; socrates, 149; victoriæ, 173
Ornix avellanella, 139
Orrhodia rubiginea, 322
Orthosia lota, 10, 46; macilenta, 7, 10, 27, 46; suspecta, 5; upsilon, 289
Orthotænia branderiana, 167; ericetana, 13, 167, 194; striana, 167
Pædisca bilunana, 189; corticana, 14, 189, 328; fuscana, 14; occultana, ophthalmicana, oppressana, 189; profundana, 14, 189; semifuscana, 14, 189; solandriana, 5, 7, 189; sordidana, 189
Pachnobia rubricosa, 10, 170
Pachygastris trifolii, 328, 332
Panacra lignaria, 73, 194
Panagra petraria, 12, 171
Panolis piniperda, 10, 252
Panopea lucretia, 310
Papilio alyattus, 29; aurantiaca, 95; demoleus, 104, 291; erectus, 199; feisthamelii, 229, 230; latinus, 31; leonidas, 104; machaon, 88, 93, 94, 95, 195, 229, 230, 231, 245, 286; podalirius, 95, 195, 219, 229, 230; ptolychus, 199; pylades, 104; xexis, 29
Paraponyx stratiotalis, 6
Parage achine, 93; adrasta, 231; egeria, 75, 97, 171, 196, 228, 324, 326; egerides, 119; mæra, 93, 231; megæra, 93, 95, 117, 119, 228, 231, 245, 270, 287, 325; roxelana, 100
Parasa urda, 106
Parasia lapella, 211
Pardaleodes incerta, 105
Pardia tripunctana, 134
Pardopsis punctatissima, 309
Pareumelea perlimbata, 107
Parnara borbonica, 105
Parnassius apollo, 29, 31, 93, 94, 95, 336; delius, 29, 31; hesebolus, 29; imperator, 149; mnemosyne, 95; pseudonion, 95
Pechypogon barbalis, 328
Pelurga comitata, 6, 13

- Penthina betulætana*, 7, 133; *capræana*, carbonana, 133; *corticana*, 13, 132; *cynosbatella*, 133; *dimidiana*, 133; *gentiana*, 133; *marginana*, 13; *nigro-costana*, *ochroleucana*, 133; *picana*, 3; *prælongana*, *pruniana*, *sellana*, 133; *variegana*, 13
Pericallia syringaria, 289
Perittia, 159
Peronea aspersana, 13, 132; *comparana*, *cristana*, 131; *ferrugana*, 7, 13, 132; *hastiana*, 131; *schalleriana*, 131; *sponsana*, 13, 131; *umbrana*, 131; *variegana*, 131
Petasia cassinea, 290
Pharetra menyanthidis, 50
Pheosia dictæa, 120
Phibalapteryx lapidata, 146; *tersata*, 289; *vitalbata*, 4, 13, 247
Phigalia pedaria, 11, 144, 174; *pilosaria*, 26, 144, 289
Philodeudorix cærulea, 101
Phissana flava, 77
Phlæodes demarniana, 188; *inmundana*, 14, 188; *tetraquetana*, 188
Phlogophora meticulosa, 4, 27, 46, 76, 270, 289
Phorodesma bajularia, 289
Phoxopteryx lactana, 3, 169; *lundana*, 14, 169; *mitterpacheriana*, 169; *myrtillana*, 169, 194; *siiculana*, *uncana*, *upupana*, 169
Phragmatobia fuliginosa, 23
Phrissura sylvia, 103
Phryganodes quadriguttatta, 107
Phtheochroa rugosana, 168
Phycis adornatella, 13; *roborella*, 6
Phytometra ænea, 247; *viridaria*, 4, 289
Pieris brassicæ, 48, 50, 95, 118, 196, 228, 229, 230, 243, 245, 246, 270, 288, 324, 325; *bryoniæ*, 50, 94; *callidice*, 94, 95; *daplidice*, 50, 95, 229, 230, 245, 286; *ergane*, 30; *mesentina*, 61; *napi*, 50, 78, 94, 118, 223, 242, 245, 287, 288, 324; *rapæ*, 30, 75, 96, 118, 171, 223, 228, 229, 230, 245, 246, 270, 288, 324
Pinacopteryx liliana, 103
Pionea forficalis, 6, 13, 76, 247; *stachydalis*, 244
Planema arcifascia, 309; **arenaria*, *con-sanguinea*, **dorothææ*, *esebria*, 135; *gea*, *umbra*, 67
Platylesches batangæ, 105
Platyptilia bertrami, 6, 13; *gonodactyla*, 5, 13; *ochrodactyla*, 6, 13
Plecoptera resistens, 107
Plusia bractea, *chrysitis*, 11; *festucæ*, 11, 116, 118; *gamma*, 11, 31, 51, 116, 247, 270, 288, 289; *interrogationis*, 26; *moneta*, 31, 120, 172, 196, 220, 242, 243, 244, 320, 323
Plutella cruciferarum, 6
Pæcilocampa populi, 27, 118
Polia chi, 11, 27; *flavicincta*, 7; *nigro-cincta*, 271; *xanthomesta*, 271
Polygonia c-album, 75, 93, 96, 324; *hutchinsonii*, 96 (see also *Grapta*)
Polygonmatus artaxerxes, 266; *bæticus*, 102; *corydon*, 78; *omphale*, 63; *phlæas*, 75, 246; *thersamon*, 63; *virgaureæ*, 245 (see also *Chrysophanus* and *Lycæna*)
Porthesia auriflua, 118, 270; *chrysorrhœa*, 246; *similis*, 118, 171, 246, 289
Precis amestris, 67; *archesia*, 310; *calescens*, 310; *ceryne*, 67, 310; *coelestina*, 310; *cuama*, 67; *gregorii*, *in-facta*, 310; *leodora*, 67; *orthosia*, 68; *pelarga*, 67, 310; *sesamus*, 310; *terea*, 67, 310; *trimeni*, 67
Procris geryon, 26
Protoparce convolvuli, 329
Psamotis pulveralis, 268
Psecadia bipunctella, 52
Pseudargynnis hegemon, 310
Pseudosmerinthus submarginalis, 105
Pseudoterpna cytisaria, 290; *pruinata*, 12, 289
Psilura monacha, 198
Pterophorus monodactylus, 6, 13; *ptero-dactylus*, 6
Pterostoma palpina, 269
Ptilodontis palpina, 6
Ptycholoma leachiana, 13, 132
Pygera curtula, 293
Phyllobrostis daphneella, 160
Phylloenistis, 159
Pyralis costalis, 4, 247; *farinalis*, 13; *glauceinalis*, 130; *lienigalis*, 294
Pyrameis atalanta, 93, 228, 229, 230, 231, 270; *cardui*, 67, 96, 196, 219, 228, 229, 230, 231, 246, 267, 270, 309
Pyrausta ostrinalis, 13; *purpuralis*, 247
Pyrodes rheediella, 193
Remigia archesia, 107
Retinia buoliana, 191; *pinicolana*, 191, 272; *pinivorana*, 191
Rhacodia caudana, 13, 133
Rhodocera rhamni, 56
Rhodophæa consociella, 4, 13; *formosa*, 4, 244; *tumidella*, 5
Rhopalocampta forestan, 105
*Rigema *aurifodina*, 213; *ornata* 77
Rivula sericealis, 11
Rœslerstammia erxebella, 175
Roxana arcuana, 167
Rumia creatagata, 171; *luteolata*, 11, 120, 289
Rusina tenebrosa, 46, 289
Salamis anacardii, *cacta*, *temora*, 311
Salassa maia, 106
Samia cecropia, 78
Sarangesa synestalmenus, 105
Saturnia carpi, 26, 120, 197; *pavonia*, 48, 51, 52, 116, 269, 332
Satyrus actæa, 93, 94; *alcyon*, 94; *an-the*, 99, 100; *cœrdula*, 93; *dryas*, 97;

- hanifa, 99; hermione, 93, 94; ianira, 292, 323; pelopea, 100; semele, 30, 93, 119, 124, 245, 288, 325; sichæa, 100; statilinus, 100; telephassa, 100; uhagoni, 30
- Schenobius forticellus, 13
- Sciaphila alternata, chrysanthæana, 6, 168; conspersana, 13, 168; colquhounana, 13; hybridana, 168; ictericana, 169; nubilana, pascuana, sinuana, 168; subjectana, 13, 168; virgaureana, 13, 168
- Scodiona belgiaria, 12, 171
- Scoliaula quadrimaculella, 272
- Scoparia ambigualis, angustea, basistrigalis, cembræ, cratægella, 13; dubitellus, 13, 247; mercurella, 13; resinæ, 13
- Scopelosoma satellitia, 10, 46, 170, 290
- Scopula alpinalis, 146; ferrugalis, lutealis, 13; olivialis, 247; prunalis, 13
- Scotosia dubitata, 26
- Selenia bilunaria, 11, 125; illunaria, 51, 125, 170; illustraria, 121; juliaria, 125; lunaria, 46; tetralunaria, 170
- Selidosema ericetaria, 12; plumaria, 149
- Semasia ianthinana, rufillana, spiniana, wœberiana, 190
- Sericoris abscisana, 134; bifasciana, 134, 220; cespitana, 134; lacunana, 13, 134; littoralis, 13, 134; rivulana, 134; urticana, 134
- Sesamia nonagrioides, 327
- Sesia allantiformis, andreniformis, conopiformis, 286; chrysidiformis, 329; ichneumoniformis, 150, 329; myopiformis, 286
- Sideria achatana, 134
- Smerinthus atlanticus, 333; ocellatus, 4, 116, 120, 333; populi, 4, 116, 120; tiliæ, 116, 120
- Spalgis epius, 202
- Sphaleroptera ictericana, 4
- Sphingomorpha monteironis, 107
- Sphinx casuarinæ, 44; convolvuli, 6, 24, 25, 31, 46, 50, 74, 75, 172; ligustri, 6, 31, 116, 120; pinastri, 120, 129
- Spilodes cinctalis, palealis, 6
- Spilonota incarnatana, 13, 134; ocellana, 6; roborana, roseolana, trimaculana, tripunctana, 134
- Spilosoma lubricipeda, 247, 289; menthastri, 118, 269, 329
- Spindasis nilus, 101
- Stauropus fagi, 267, 292
- Sterrhæa sacraria, 12
- Stigmonota compositella, 191; germerana, 192; internana, leguminana, 191; nitidana, 3; perlepidana, 191; redimitana, 3, 192; regiana, 14; roseticolana, 192; weirana, 191
- Stilpnobia salicis, 269
- Strenia clathrata, 4
- Sukidion iasis, 101
- Symæthis oxyacanthella, 14
- Syntomis interniplaga, 105
- Syrichthus alveolus, 290; lavateræ, 94; malvæ, 100, 119, 326; melotis, nomas, orbifer, poggei, 100; sao, 230; tersellum, 100
- Tæniocampa cruda, 26, 46, 170; gothica, 10, 26, 46, 170, 290; gracilis, 10; incerta, 10, 199, 223; instabilis, 26, 46; miniosa, 223, 291; munda, 46; populi, 50; pulverulenta, 10, 145; rubricosa, 26; stabilis, 10, 46, 170, 200.
- Tæniopyga sylvana, 77
- Tanagra atrata, 289
- Tapinostola fulva, 146
- Tarucus plinius, 102
- Telea polyphemus, 143
- Tephroclystia vulgata, 32
- Tephrosia biundularia, 12, 195, 289, 330; crepuscularia, 26, 171; punctulata, 3; delamerensis, 330
- Teracolus amelia, dodecora, evagore, evippe, isaura, loandicus, maimuna, 103; simplex, xanthevarne, 104
- Teras contaminana, 13, 132
- Terias brenda, 104; brigitta, hopale, orientis, regularis, zoe, 104.
- Tethea subtusa, 4, 27
- Thais cecisy, 29, 61; rumina, 230, 231
- Thanaos tages, 75, 119, 246, 324
- Thecla betula, 246; candatula, 63; ilicis, 63, 93; myrtale, 63; pruni, 245; quercus, 5, 75, 119, 246, 289; rubi, 26, 75, 119, 246, 289, 326; spini, 93; w-album, 115, 119, 325
- Thera firmata, 6, 171, 289; juniperata, 146; variata, 6, 7, 13, 117, 171, 289, 330
- Thestor ballus, 228, 229; callimachus, 63
- Thyatira batis, 5, 46, 289, 290, 326; dæra, 4, 5, 46, 289
- Thyridopteryx ephemeriformis, 149, 151
- Thyris, 159
- Tiliacea aurago, 328
- Timandra imitatoria, 4
- Timora transvaalica,* 212
- Tinea biselliella, 6; merdella, 3; nigripunctella, 4; tapetzella, 6
- Tischeria, 162
- Tithorea flavescens, megara, 29
- Tortricodes hyemana, 211
- Tortrix cinnamomeana, 130; corylana, 130; costana, 13, 130; cratægana, 129; diversana, 130; fosterana, 13, 131; heparana, 13, 130; latiorana, ministrana, palleana, 131; piceana, 220, 272; podana, 129; ribeana, roseana, sorbiana, 130; unifasciana, 13, 130; xylostæana, 13, 130
- Trachea piniperda, 26, 170
- Triphæna comes, 10, 50, 78, 120, 196, 289; fimbria, 10, 120, 171, 173, 196, 270, 289, 291; ianthina, 10, 46, 289; interjecta, 10, 46, 150, 270; orbona,

46, 270; pronuba, 5, 10, 46, 76, 120, 150, 247, 270, 289, 326; subsequa, 249
Tirumala petiverana, 278
Trochilium crabroniformis, 289
Tropæa luna, 143
Trycheris aurana, 209
Uropteryx sambucata, 11, 26, 120, 289
Utetheisa pulchella, 105
Vanessa antiopa, 29, 96, 245, 285, 297, 325, 328; *atalanta*, 26, 27, 28, 53, 75, 119, 196, 245, 246, 286, 288, 322, 325; *c-album*, 27, 125; *cardui*, 56, 76, 119, 219, 267, 285, 288, 322, 325; *egæa*, 99; *io*, 3, 26, 28, 75, 93, 145, 170, 245, 270, 285; *ichnusa*, 265; *polychloros*, 28, 75, 118, 121, 144, 145, 170, 229, 230, 245, 270, 324; *turcica*, 99; *urticæ*, 23, 26, 27, 99, 118, 144, 145, 171, 246, 265, 270, 287, 288, 321, 323, 324, 325, 328; *virginiensis*, 245
Vanessula milea, 309
Venilia macularia, 11, 26, 116, 120
Venusia cambrica, 26
Virachola antalus, *livia*, 101
Xanthia cerago, 27; *circellaris*, 10; *citrago*, 25, 27; *ferruginea*, 27, 46; *flavago*, 10; *gilvago*, 25, 27, 46; *ocellaris*, 25 (see *Mellinia* and *Tiliacea*)
Xanthosetia hamana, 6, 14, 210; *zoe-gana*, 14, 210

Xylina conformis, 25; *furcifera*, 25; *ornithopus*, 11; *rhizolitha*, 46; *socia*, 11, 170, 171
Xylocampa areola, 11; *lithorhiza*, 145, 171
Xylophasia combusta, 145; *hepatica*, 46, 289; *lithoxylea*, 5, 46, 247, 289; *monoglypha*, 50, 288, 289; *polyodon*, 46, 50, 76, 247, 269, 270, 288, 289; *rurea*, 46, 145, 269; *scolopacina*, 5; *sublustris*, 270
Ypthima albida, 278; *asterope*, 100, 278; *doleta*, 66; *itonia*, 66, 278; *pupullaris*, 278; *simplicia*, 66
Zana sp., 106
Zanclognatha grisealis, *tarsipennalis*, 11, 289
Zegris meridionalis, 231
Zelleria phillyrella, 55
Zephyrus quercus, 30, 95
Zenzera æsculi, 52, 120, 269; *pyrina*, 330
Zizera knysna, 102
Zonosoma annulata, 275; *linearia*, 12; *pendularia*, 50, 275, 294; *porata*, *punctaria*, *omicronaria*, *orbicularia*, 275; *subroseata*, 276
Zygæna filipendulæ, 6, 26, 76, 120, 242, 270, 326; *lonicera*, 289; *minioides*, 151; *minos*, 265, 330; *orobi*, 151; *trifolii*, 151, 241

NEUROPTERA (Linn.).

PSOCIDIA.

Atropos, 248
Psocidæ, 248

PERLIDIA.

Perla maxima, 32

EPHEMERIDIA.

Centroptilum luteolum, 183; *pennulatum*, 183
Cloëon rufulum, 183
Ecdyurus volitans, 183
Ephemera danica, 183; *vulgata*, 183
Leptophlebia marginata, 183

ODONATA.

Æschna cærulea, 147; *cyanea*, 36, 74, 201, 323; *grandis*, 36, 267, 268; *isosceles*, 146; *junceæ*, 36; *mixta*, 36, 147
Agriion mercuriale, 38, 149; *puella*, 37, 74, 115, 116, 147, 247; *pulchellum*, 37, 147
Anax imperator, 36, 147
Brachytron pratense, 36, 147, 247
Calopteryx splendens, 33, 36, 147, 201; *virgo*, 36, 115; *virgo* var. *anceps*, 36
Cordulegaster annulatus, 35, 74, 115
Cordulia ænea, 147

Enallagma cyathigerum, 38, 147, 267
Erythromma najas, 267, 268
Gomphus vulgatissimus, 35, 149
Ischnura elegans, 37, 49 (*recte* *pumilio*), 115, 147, 247, 267; *elegans* var. *rufescens*, 37; *pumilio*, 37, 149; *pumilio* var. *aurantiacum*, 37, 49
Lestes barbara, 147; *dryas*, 268, 271; *sponsa*, 37, 74, 268, 271
Libellula depressa, 33, 74, 115, 116, 146, 147, 172, 247; *fulva*, 34, 49, 146, 147; *quadrinaculata*, 33, 74, 147, 247, 267; *quadrinaculata* var. *præ-nubila*, 33
Orthetrum cærulescens, 34, 74, 146, 147, 293 (*recte* *cancellatum*); *cancellatum*, 34, 146, 293
Oxygastra curtisii, 34, 49
Platynemus pennipes, 37, 247
Pyrhosoma nymphula, 33, 37, 74, 149, 171, 247; *tenellum*, 37; *tenellum* var. *rubratum*, 37; *tenellum* var. *æneatum*, 37
Sympetrum flaveolum, 147; *scoticum*, 33, 115; *striolatum*, 33, 74, 147, 267

PLANIPENNIA.

Chrysopa flava, 183; *perla*, 183, 184, 248; *septempunctata*, 184; *ventralis*, 184; *vulgaris*, 183, 184
Hemerobius stigma, 184

Mantispa semihyalina, 291
Neuroptera bipennis should be *Nemoptera bipennis*, which see
Nemoptera bipennis (*lusitanica*), 271
Panorpa communis, 184; *germanica*, 183, 184
Raphidia, 266; *notata*, 184; *xanthostigma*, 183
Sialis lutaria, 183, 184
Sisyra fuscata, 183, 184

TRICHOPTERA.

Anabolia nervosa, 183
Colpotaulius incisus, 184
Glossoma boltoni, 184
Goëra pilosa, 184
Grammotaulius atomarius, 184

Hydropsyche ornatula, 323
Hydrotilidæ, 30
Leptocerus annulicornis, 184; *cinereus*, 183
Limnophilus lunatus, 183; *rhombicus*, 184
Lype phæopa, 184
Micropterna sequax, 323
Mystacides azurea, 183; *nigra*, 183, 184
Neuroclipsis bimaculata, 184
Notidobia ciliaris, 183, 184
Oxyethira, 30
Phryganea striata, 183, 184
Tinodes unicolor, 323; *wæneri*, 184
Triænodes conspersa, 323

ORTHOPTERA.

Amblycorypha oblongifolia, 32
Anechura bipunctata, 150; *bipunctata* var. *orientalis*, 150
Anisolabis mauritanica, 331
Apterygida japonica, 331
Blabera gigantea, 174
Blatta, 198; *australasiæ*, 267
Chelidura bolivari, 331
Creoboter urbana, 198
Diplatys, 336
Dyscritina, 336
Ectobia lapponica, 293

Ephippiger, 22
Forficula pubescens, 331
Gryllotalpa vulgaris, 223
Hierodula vitula, 198
Labidura riparia, 268, 331
Mantis, 174
Pomatonota dregii, 22; *bipunctata*,* 22
Polyspilota striata, 198
Spongiphora croceipennis lherminieri, 331
Tenodera aridifolia, 198

RHYNCHOTA.

Acanthocephala, 137
Acanthomia tomenticolis, *tomentosicollis*, 316
Ægalens bechuana, 167
Agondas,* *Kirk.*, 316
Aleurodes citis, 334
Amorguis cordofanus, *niloticum*, 167
Antestia lineaticollis, 167
Antilochus coquebertii, 164
Aphrophora, 215; *alni*, 217
Aracopus crassicornis, 236
Arctocoris, 137
Arctorthesia,* *Cock.*, *cataphracta*, *occidentalis*, 114, 259
Ascelis echiniformis, 114
Aspidiotus maskelli, 111; *perniciosus*, 334
Aspidoproctus pertinax, 257
Astemma mimus, 282
Asterolecanium bambusæ, *bryoides*, *delicatum*, *miliaris*, *palmæ*, *solenophoroides*, *stellatum*, *urichii*, 114
Athyasanus obsoletus, *striatula*, *striola*, 199
Aulacaspis auranticolor, *boisduvalii*,

cattleyæ, *crawii*, *fagraeæ*, *fulleri*, *loranthi*, *maculata*, *miranda*, *pentagona*, *persimilis*, 59; *rosæ*, 58, 59
Bambusaspis,* *Cock.*, *bambusæ*, *delicatum*, *miliaris*, *palmæ*, *solenophoroides*, *urichii*, 114
Brachyplatys vanikorensis, 136
Callidea, 137
Callipappus australis, *bufo*, *farinosus*, *imimanis*, *rubiginosus*, *westwoodi*, 258
Calliphara, 137
Calymnatus, 336
Calyproctus, 236
Calypticus, 336
Centrotus, 235; *cornutus*, 234
Cephalelus infumatus, 248
Ceratocoris, 166
Ceroplastes candela,* *Cock.* and *King*, 113; *cristatus*, 114; *egbarum*, *fulleri*,* *Cock.*, 113
Ceroplastodes dugesi, *niveus*, 194
Charagochilus, 315
Chionaspis exalbida,* *Cock.*, 112
Chrysocoris, 137
Cicada, 214—216

- Clavigralla, 316
 Clerada apicicornis, 224
 Coccus cacti, hesperidum, 336
 Cochrus, 137
 Cœlostoma assimile, 114; zealandicum, 258
 Cœlostomidia assimilis, 114, 258, compressa, pilosa; wairoensis, 258; zealandica, 114, 258
 Corixa, 127; striata, 175
 Coryzoplatus, 137
 ✓Cosmopsaltria gammameda,* *Dist.*, vibrans, 256
 Crossotosoma ægyptiaca, 257
 Crypticerya rosæ, 233
 Cyphoma characias, 259
 Cystococcus (*see* Ascelis)
 Cystosoma, 215, 261
 Dactylopius, 202; filamentosus, 113
 Darnis, 261
 Deracocoris (*recte* Deræocoris), 283
 Diaspis arizonicus, australis, baccharidis, calyptroides, celtidis, pharadendri, townsendi, 58; boisduvalii, callunæ, convexa, maculata, piricola, rosæ, zamia, 59
 Dictyocoris, 137
 Dinidor maculatus, 137
 Discogaster rhomboideus, 137
 Drosicha burmeisteri, 233, 318; contrahens, 232, 233, 318; corpulenta, crawfordi, 318; leachii, 233, 318; maskelli, 233, 318
 Dysdercus cingulatus, 164; mimus, 282; ruficollis, 164; superstitiosus, 165
 Embolophora, 167
 Empicoris, 137
 Eotrechus,* *Kirk.*, kalidasa,* *Kirk.*, 137
 Epidiaspis piricola, 59
 Eulecanium robinia, robiniarum, sub-simile,* *Cock.*, 178
 Eurybrachys, 236
 Flata nigrocincta, 222
 Fulgora, 215, 235, 236
 Gelastaspis,* *Kirk.*, browni,* *Kirk.*, 166
 Gerris euphrosyne,* *Kirk.*, 138; hesione,* *Kirk.*, 137
 Gossyparia ulmi, 151
 Guerinia serratulæ, 232
 Gutrida,* *Kirk.*; gabonia,* *Kirk.*, 284
 Halimococcus,* *Cock.*, 15; lampas,* *Cock.*, 15, 112
 Halobatopsis, 281
 Hamamelistes spinosus, 152
 Harmonides,* *Kirk.*, 316
 Hemichionaspis cyanogena, 111
 Hormaphis hamamelidis, 152
 Hydrometra agenor,* *Kirk.*, caraiba, 280; mensor, metator, naiades,* *Kirk.*, 281; stagnorum, 174
 Icerya ægyptiaca, albolutea, brasiliensis, crocea, formicarum, koebelei, littoralis, 257, 318; montserratensis, natalensis, palmeri, pilosa, 257; purchasi, 257, 318; rileyi, schrottkyi, seychellarum, tangalla, 257; tomlensis, 318
 Irochrotus, 137
 Issus, 235
 Janthe, 316
 Kallistometra, 281
 Læmocoris poseidon,* *Kirk.*, ravenar,* *Kirk.*, 315
 Leachia fuscipennis, 233
 Lecaniodiaspis rufescens, 178
 Lecanopsis dugesi, 194
 Ledra aurita, 235
 Leptopsaltria japonica, 258
 Liburnia, 167
 Libyaspis,* *Kirk.*, 136, 166; coccinelloides, 136; wahlbergii, 167
 Llaveia axin, 232, 233, 318; bouvari, cacti, mexicanorum, primitiva, 319; saundersii, 233, 318; uhleri, 319
 Lophococcus miralibis, 233
 Mabelia pulcherrima, 293
 Macrodera micropterum, 271
 Macropsis læta var. pæta, 32
 Makua,* *Kirk.*, psale,* *Kirk.*, 282
 Maotys, 137
 Marganella (*recte* Morganella), 111
 Margarodes capensis, 258; formicarum, 257, 258; gallicus, hameli, hiemalis, perrisi, polonicus, rileyi, trimeni, vitium, 258
 Megamelus, 235
 Meginoë,* *Kirk.*, hovana,* *Kirk.*, 283
 Melanochila, 165
 Membracis tectigera, 224
 Metapodiessa,* *Kirk.*, 137
 Microvelia stellata,* *Kirk.*, 281
 Mimosicerya hempeli, 233
 Monophleba, 318
 Monophlebe, 317
 Monophlebulus fuscus, 233, 318
 Monophlebus atripennis, 232, 318; axin, 232, 319; burmeisteri, 232; cacti, 232, 319; championi, contrahens, corpulentus, 232; crawfordi, 232, 319; dubius, 232, 318; fabricii, 232; fortis, fulleri, 232, 319; fuscus, guerini, illigeri, leachi, 232; littoralis, 318; maskelli, 232, 319; mexicanorum, primitivus, 232; raddoni, 232, 319; saundersi, 232; serratulæ, 232, 319; uhleri, 232; zeylanicus, 232, 319
 Morganella (*see* Marganella)
 Mormidea lugens, montandoni,* *Kirk.*, 165
 Nepa, 253
 Nysius destructor, raphanus, 165
 Odontoscelis, 137
 Orthezia artemisia, annæ, 259; cataphracta, 114, 259; cheilanthe, delavauxi, floccosa, garryæ, graminis,

- insignis, lasiorum, manariensis,
 monticola, nigrocincta, 259; occi-
 dentalis, 114, 259; praelonga, souren-
 sis, ultima, urticae, 259
Ortheziola fodiens, signoreti, vej dovskyi,
 260
Orthœa, 137
Ortonia uhleri, 232
Palæococcus australis, brasiliensis,
 ewarti, fuscipennis, hellenicus, hem-
 peli, irregularis, mexicanus, nudata,
 pinnatus, plucheæ, rosæ, simplex,
 townsendi, trivenosus, 233
Pamera, 137
Parlatoria crotonis, pergandei, proteus,
 59
Parmula, 316
Perissopneumon ferox, 233
Phenacobryum, * *Cock.*, bryoides, stella-
 tum, 114
Phenacoleachia zealandica, 260
Phœnicococcus marlatti, 15
Plataspis metallica, 136
Platycephala, 136
Plexaris, * *Kirk.*, 282; saturnides, *
Kirk., 283
Plinthisus brevipennis, 271
Plociomera, 137
Podops inuncta, 271
Pœciloscytus, 315
Poliaspis carissæ, * *Cock.*, 112; cycadis,
 59, 112; media, 112
Polymerus, 315
Pomponia japonensis, 256
Porphyrophora gallicus, hameli, perrisi,
 polonicus, 258
Proticerya littoralis, rileyi, 257
Protortonia primitivus, 232
Ptilocnemidia, * *Kirk.*, lemur, 137
Ptilocnemus fuscus, 137
Ptilocerus, 137
Ptochiomera nodosus, 137
Reduviolus ferus, 51
Reduvius, 136; personatus, 201
Rhagovelia angustipes, crassipes, 64;
 nigricans, 63; ravana, 64
Rheumatometra, * *Kirk.*, philarete, *
Kirk., 281
Rhynchocoris hamatus, humeralis, 136
Rhynocoris nitidulus, strophades, *
Kirk., 136
Rhyparochromus chiragra, praetexta-
 tus, 271
Sasakia, * *Kuwana*, 258; quercus, 259;
 zeylanicus, 319
Sciocoris cursitans, 271
Sephina maculata, vinula, 165
Shana, * *Kirk.*, ravana, * *Kirk.*, 316
Solenococcus, 15
Sphærogaspis capensis, vitium, 258
Spudæus, 320
Stictocoris flaveola, 174
Stigmatococcus asper, ferox, 233
Tachardia cornuta, 178
Tapeinus fuscipennis, 136
Tessarobelus championi, 233, 318;
 guerinii, 232, 233, 318
Tettigometra costulata, 236
Tettigonia, 234, 235; viridis, 215, 217
Theraneis luridus, oleosus, 293
Trama troglodytes, 32
Trapezonotus agrestis, 271
Typhlocyba, 214; candidula, 174;
 coloradensis, 285
Ultracælostoma, * *Cock.*, 114; assimilis,
 114, 258
Ursocoris, 137
Velia nigricans, 63
Walkeriana andreae, compacta, euphor-
 biæ, floriger, pertinax, polei, senex,
 257
Xylococcus betulæ, filiferus, quercus,
 259

ERRATA IN VOL. — Page 52, for Finns, read Imms; page 64, for ravana n. sp., read ravana, *Kirk.*; pages 331 and 332, for Emmetica cervinata read Eubolia cervinata.

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SOME ABERRATIONS OF BRITISH BUTTERFLIES CAPTURED IN 1901.



I AM indebted to Mr. E. Sabine, of Erith, for a loan of the interesting specimens figured above.

Fig. 1.—*Argynnis aglaia* ♂. Taken by Mr. L. W. Newman, at Eynsford, last year. This example is somewhat similar to an aberration of the female of *A. adippe* (*A. aglaia* in error) figured Entom. xv. pl. i. figs. 2, 2a. On the upper surface the marginal and antemarginal spots are more elongated: on the under surface the confluent, silvery, basal spots of hind wings form distinct patches, and there are some silvery oblong spots on outer marginal area.

Fig. 2.—*Epinephele ianira*, ♂. Also captured at Eynsford, last year, by Mr. Newman. The upper surface is of the usual colour and otherwise normal, but on the under surface the discal area of the fore wings is whitish grey, inclining to buff towards base and inner margin; the margins and outer border of these wings are greyer than usual. The hind wings are also greyer than in typical specimens.

Fig. 3.—*Lycæna corydon*. So far as regards the body and three of the wings this appears to be a male specimen, the left fore wing and half of the thorax, however, are of the female colour, with some patches of blue scales on the wing. On the under surface the specimen seems to be normal, except that there is a broad dark-grey dash along the costal area of the left fore wing. This specimen was taken at Purley, by Mr. Kirkman, of Plumstead.

When sending the specimens just referred to, Mr. Sabine also included some other varieties that he had obtained during last season. Among these were the following:—A fine example of *syngrapha*, the blue female form of *L. corydon*, taken by Mr. Stockwell, at Dover. An example of *Euchloë cardamines* with curious pale orange tips (Plumstead). Two specimens of *Chrysophanus phloxas*, taken by his son, at Dartford, in October; one of these had unusually large blue spots on the hind wings, and the other had the black before the band on the hind wing delicately streaked with the coppery colour.

RICHARD SOUTH.

NOTES ON LEPIDOPTERA IN SUFFOLK IN 1901.

By CLAUDE A. PYETT, M.I.J.

It was with pleasure that I was able this year to renew acquaintance with my favourite branch of entomology after two years' comparative inactivity, owing to pressure of professional engagements, and this *résumé* of my more notable captures in Suffolk will, I think, show that the season has been exceptionally productive from the lepidopterist's point of view.

Briefly summarised, the year has been remarkable in one curious respect, that many of the usually common species have been conspicuous by their infrequent occurrence, whilst rarities have turned up in unexpected places. In speaking of the productiveness of the season, however, I should exclude the first five months of the year, during which moths were decidedly scarce, collecting at light, with which I am principally familiar, being an absolute failure. This circumstance I attribute to climatic influences, the weather being "magnificently feminine," as a London editor facetiously described it. A few warm sunny days were sandwiched in a long period of wet, wintry, and windy weather, and I witnessed the unusual spectacle of four species of

hybernated butterflies disporting themselves in the centre of Ipswich one spring-like morning in April. These included two *Gonepteryx rhamni* and *Vanessa io* (which seems to be getting scarcer year by year), whilst I also saw one *Colias edusa* at Barham later on—the only specimen of this irregular visitor which I encountered this year.

Looking at my diary I find the first noteworthy capture was *Tephrosia punctulata*, several of which were boxed on tree-trunks in Woolpit Wood on June 8th, together with one *T. extersaria*. The last-named was also netted at Bentley Wood on the 29th, when several other local Geometræ were beaten, viz. *Macaria notata* (a long series), *Bapta temerata*, *Ephyra punctaria*, *Acidalia trigeminata* (a rubbed specimen), *A. candidata* and *A. luteata*. Plenty of Micros were disturbed, including two which had not previously been recorded in the county, viz. *Stigmonota redimitana* = *nitidana* and *Penthina picana* = *corticana*. A number of *Crambus inquinatellus* were taken, also *Halias prasinana* (female), *Harpella geoffrella*, *Halonota cirsiana*, *Dicrorampha politana*, *Phoxopteryx lactana*, *Coleophora limosipennella* (two), and *C. anatipennella*. I was also rather surprised to take *Homæosoma sinuella* so far inland.

Anent my capture of *Acidalia trigeminata*, I gather from correspondence with Mr. C. G. Barrett, that this pretty species (which beginners using "Newman's" are apt to confuse with *A. bisetata*, owing to the transposition of the figures) is becoming very scarce in this country. It may therefore be interesting to record the wide distribution of the moth in the Ipswich district. I have met with it several times during an experience of eight years, in fact I have not set all I have taken. It has more than once come to light, but usually I have found it on palings, and in this situation I secured it this summer—three in the borough, one at Westerfield, and another at Barham, in addition to the Bentley specimen. I find on looking back through my diary that my first record for the species was in the summer of 1895.

Reverting to my captures for June, the finding of *Cossus ligniperda* and *Orgyia pudibunda* on palings in the town may be mentioned. I also saw lying in the road whilst cycling through Little Glemham a damaged specimen of *Arctia villica*, a moth which is by no means so common hereabouts as one might expect. July was ushered in with *Dipterygia pinastri* (*scabriuscula*), two of which were detected under a wall ledge; whilst on the 2nd an interesting addition was made to the Suffolk list of Micros in the shape of *Tinea merdella*, which was flying in numbers in the Lecture Hall, Ipswich, their presence being presumably accounted for by the baize covering of the platform. I could have secured some fifty specimens, but being engaged reporting a meeting, I only managed to box two which alighted

close by. A day or two later I boxed *Tinea nigripunctella* on the entrance door of the hospital. This species was also new to the county. Light yielded some notable captures, including the rare *Apamea ophiogramma*. I may mention that Mr. Hy. Miller, of Ipswich, tells me that he and Mr. Hy. Lingwood, of Needham Market, have also taken this species this year. It should be explained that all my collecting at light has been at suburban street lamps fitted with incandescent mantles, and a nocturnal excursion has never failed to result in a good capture. The best records for the month included *Smerinthus ocellatus*, *S. populi*, pale forms of *Bombyx neustria*, *Nudaria senex*, *Liparis salicis*, *Amphidasys betularia* var. *double-dayaria* (which is not infrequently met with in Ipswich), *Leucania conigera*, *L. lithargyria*, *Hecatera serena* (several), *Aplecta advena*, *Thyatira derasa*, *Tethea subtusa*, *Acidalia rubricata*, *Iodis vernaria*, *Phibalapteryx vitalbata*, *Cidaria fulvata*, *Eupithecia frarinata*, *E. subnotata*, *E. oblongata*, *E. succenturiata*, *E. sobrinata*, *E. pumilata*, *Strenia clathrata*, *Emmelesia alchemillata*, *E. decolorata*, *Timandra imitaria*, &c.

The Micros were also well represented, the commonest being the pretty *Pyrallis costalis*. This was constantly met with from the beginning of July right up to October, and it was nothing unusual to see three or four on a lamp. It would have been a perfect pest but for the peculiar habit it has of resting with its wings pressed flat on the glass, by which, viewed from below, it is readily distinguished. *Endotricha flammealis* was also a frequent visitor to light in the town, and single specimens were also taken of *Euzophora pinguis*, *Halonota fænella*, *Ephestia elutella*, *Myelois cribrum*, *Carpocapsa pomonella*, *Homœosoma nebulella*, *Rhodophaea formosa*, *R. consociella*, *Sphaleroptera ictericana* (female), and *Hydrocampa stagnalis*.

The specimen of *R. consociella* requires more than passing notice, it being a very fine variety—dark purple instead of bright purplish red. Mr. C. G. Barrett thinks it may be a local form, as it quite differs in colour from any that he has hitherto seen; but I cannot settle the point, as I have never met with the species before. I searched the few oaks in the neighbourhood in hopes of finding some of the larvæ, but was not successful. Another interesting and unique capture was an exceptionally fine and large pale variety of *Acidalia incanaria* (*virgularia*), which I took near Bentley. This has also been examined by Mr. Barrett, who considers it the most beautiful and by far the most distinctly marked specimen of this rather obscure species which he has ever seen. He informs me that this pale form is known abroad, but he does not recollect it occurring elsewhere in this country. I think it must be a local form, as I have another older specimen, quite as large, and taken several years ago in Ipswich, whilst two or three others were met with in the same

spot at Bentley; but as I was not at the time aware that they differed from the type, I unfortunately did not trouble to set them out. I intend, however, to try and get other similar examples next year.

Bentley Wood was a veritable happy hunting-ground during July. I made two or three visits there with Mr. A. E. Gibbs, of St. Albans, and we tried sugar with good results, the best Noctuæ being *Orthosia suspecta*, *Thyatira batis*, *T. derasa*, *Noctua baia* (in profusion), *Cerigo cytherea*, *Amphipyra pyramidea*, *Dipterygia pinastri*, *Xylophasia scolopacina*, &c. Numerous specimens of *Herminia tarsipennalis* and *Endotricha flammealis* were also boxed, whilst *Triphæna pronuba* was present in abundance. A day with the beating-stick on the 23rd was productive of fairly good results. Being dull, butterflies were only occasionally seen, and the only noteworthy captures were *Limenitis sibylla* and *Thecla quercus*. The former were getting over, and I congratulated myself on having made a special visit a fortnight earlier, when I netted eight grand specimens. Scores could have been easily taken, I am glad to say, notwithstanding the regrettable fact that something like a thousand specimens were caught last year by two or three unprincipled collectors. *Calligenia miniata* was taken at dusk with *Crambus pinetellus*; *Coremia quadrifasciaria* was found on palings, and Mr. Gibbs also espied *Geometra papilionaria* on a leaf. *Xylophasia lithoxylea* was detected on a fir-trunk, resting with head downwards, a peculiarity which I have more than once noticed in regard to this species. The Micros encountered included *Harpiteryx xylostella*, several *Rhodophæa tumidella* in fine condition, *Pædisca solandriana* (rather worn), *Ebulea verbascalis*, &c. We stayed the night in the wood, putting up at a cottage. Next morning we resumed operations, but beyond *Lycæna argiolus*, *Argynnis adippe*, and *Epione apiciaria*, nothing worth recording was met with. Several eggs of *Cerura vinula* were seen on the upper surface of leaves of aspen bushes, looking to all appearances like galls. On the way home to Ipswich I boxed another *C. pinetellus*.

The latter end of August I spent at Felixstowe with Mr. Gibbs, and some scarce coast things came to sugar, including long series of *Agrotis ripæ* and *A. vestigialis*; also innumerable specimens of *A. tritici* and *A. nigricans*, many of which were very interesting varieties. On Landguard Common *Crambus contaminellus* and *Cledeobia angustalis* were found in considerable numbers in the daytime, whilst *Gelechia desertella* was swarming in the grass-tufts. Several *Homæosoma sinuella* were also netted, and two *Herbula cespitalis*. A morning with the beating-sticks on the cliffs towards Bawdsey was not very profitable, but what few things we met were good. I took a fine specimen of *Platyptilia gonodactyla* and two *Conchylis dilucidana*, the latter being a new record for the county; whilst Mr. Gibbs was fortunate in cap-

turing *Spilodes palealis*. Inspection of palings resulted in the addition of *Eupithecia coronata*, *C. pinetellus*, *Antithesia salicella*, *Spilonota ocellana*, *Sciaphila alternella* (*chrysanthæana*), *Depressaria costosa*, *D. liturella*, (*Ecogenia quadripuncta* = *kindermannii*), and *Xanthosetia hamana*; whilst *Tinea tapetzella* and *T. biselliella* were noticed at my lodgings. I had previously never met with *biselliella* outside Ipswich. It was imported into my house in a mattress in 1895, and caused havoc amongst the upholstered furniture. In the summer of 1896 I practically exterminated the pest by searching for the imagines at night, killing some two hundred altogether early in June before they had time to breed again. The gaudy *Zygæna filipendulæ* were swarming on the downs in the Landguard Fort enclosure, but I had never met with the species previously in Suffolk. Like *Euchelia jacobææ*, it seems to be very local.

Returning to Ipswich on August 2nd, I was fortunate in getting *Epunda viminalis* in good condition at light, which also yielded *Notodonta dictæa*, *Ptilodontis palpina*, *Ephyra omicronaria*, *Pelurga comitatu*, *Thera firmata*, *T. variata*, *Eupithecia centaureata*, *Crocallis elinguaris*, *Hyponomeuta padellus*, *Crambus tristellus* and *C. geniculæus* (both perfect pests), *Paraponyx stratiotalis*, *Ebulea verbascalis*, *Eudorea cembræ*, *Pionea forficælis* (abundant), *Cataclysta lemnata* (female), *Eupæcilia atricapitana*, *Phycis roborella* (rubbed), *Plutella cruciferarum*, *Depressaria subpropinquella*, *Gelechia mulinella*, *G. senectella* (?), and last but not least *Leioptilis osteodactylus*, an unexpected visitant at a street lamp, and a notable addition to the county list. Search of walls produced a nice brown female form of *Hepialus sylvinus*, whilst *Catocala nupta* was frequently met with; *Phyllocnistis suffusella* was found swarming on palings near poplars before dusk; and varieties of *Plutella cruciferarum* were beaten on Rushmere Heath. Dusking at Yoxford, the garden of Suffolk, in the beginning of the month resulted in *Ephyra punctaria*, *Platyptilia ochrodactylus* = *bertrami* (which also came to an Ipswich street-lamp), *Pterophorus monodactylus* = *pterodactylus*, *Mimæseoptilus fuscus*, *C. pinetellus*, *Spilodes cinctalis*, &c. I also secured several full-fed larvæ of *Sphinx ligustri*, which were found on an ash tree under curious circumstances, my attention being called to the frass by a lady who imagined they were smuts or gunpowder pellets from some mischievous boys in an adjoining garden! I mention this as a striking instance of rural ignorance.

September was principally noted for the occurrence of *Sphinx convolvuli*, which came regularly to the flowers of *Nicotiana affinis* in my garden just before dusk. This fine moth seems to have been abundant this year, dozens of specimens having been reported from Belstead, Stutton, and several parts of Ipswich. Light was not quite so productive, but I took a nice *Luperina cespitis*, four *Heliophobus popularis*, *Eugonia tiliaria* = *alviaria*,

Acidalia promutata, *Thera variata* (var.), and a diminutive *Acidalia aversata*.

I spent the afternoon of Sept. 7th at Bentley Wood, and curious to say, the only Macro I took was *Macaria notata*, evidently a second brood. Micros, however, were beaten in numbers. I boxed about fifty altogether, including *Cerostoma radiatella* (a variable series), *C. costella*, *C. sylvella*, *C. vittella* (?), *Chelaria hübnereella*, *Penthina betulæana*, *Dictyopteryx contaminana*, and *Ephippiphora bimaculana* (*Halonota similana*); *Grapholitha penkleriana* was also found in great numbers; also several *Peronea ferrugana* and *Pœdisca solandriana*, one or two of the latter being variable forms.

Up to the time of writing, October has yielded *Diloba cæruleocephala*, *Polia flavicincta* (several), *Eubolia cervinaria* (four), *Cidaria miata*, and *Orthosia macilenta*.

I must not close this review of the season without expressing my indebtedness to Mr. Barrett and the Rev. E. N. Bloomfield for kind assistance in determining my Micros.

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VARIATION IN THE GENUS EREBIA.

BY GEOFFREY SMITH.

PART I.

(Continued from Entom. xxxiv. p. 308.)

It is now time to look back at Table II. in the light of the foregoing remarks. This table, which actually represents case (1) is typical also of case (4). In both these cases the sex that is in the minority is also constant. A discussion of this constant factor is necessary. In Table II. the constant female heritage of $4\frac{1}{2}$ was added to the variable male heritages, and in this way the powers for the next generation were raised, with a corresponding rise in the mean power. But if males and females are in equal numbers in the next generation, then the powers in column 6, Table II., must be equally distributed between males and females. But the females have a constant power, viz. 9, hence the calculated mean power for the males will be $4\frac{1}{2}$, which is the same as in the preceding generation; hence no rise of power has taken place. In other words, the deductions that were made from this table can only hold good if the females of the next generation are ignored. I believe that there is good reason for ignoring them. For what is the meaning of this constant state of the females and variable state of the males? It means, firstly, that the variable state of the males has no

effect on the constitution of their female offspring, for if so, a mean would be established for the females intermediate between 9 and the various powers of the males. But this does not occur. Hence we must suppose that the constant power of the females is handed down independently of the males. But if this is so, what reason is there for supposing that the constant power of the females has any effect on the variable powers of the male offspring? The reason, I think, is given in the two terms constant and variable. The constant power represents the power that is typical of the species; all reversionary processes tend towards its re-establishment. It is consequently prepotent over the variable powers, and in the females asserts itself entirely, although the tendency of each female, being partly the product of a variable male, should be to vary partly in accordance with its male parent. In the males this variability is not entirely effaced by the constant heritage from the female parent, but it is largely affected by it, owing to the strength that naturally belongs to a constant and typical factor. In other words, the variable male heritage is not strong enough to influence the female offspring, but the constant female heritage is strong enough to influence the males.

In cases (5) and (6) there is supposed to be no constant or prepotent factor, so the mean (M) between the two sexes would tend to establish itself if the numbers of the sexes were equal; if one sex or the other preponderates, a state of fluctuation would be maintained. It will be well to follow this out a little more closely.

In cases (1) and (4) one of the sexes was supposed to be constant with regard to the character under consideration: it was shown for case (1), and so incidentally for case (4), that a state of equilibrium or comparative constancy would be attained for the variable sex if every individual paired, by means of a steady march in the direction of the constant sex. It has also been shown that if the sexes are quite unequal in number, this steady march is very unlikely to occur.

Now, in cases (5) and (6) there is no constant sex, *ex hypothesi*, to which the other is to conform. How then would a state of equilibrium be attained, supposing the sexes were equal in numbers. Let us take an instance.

The M of certain males of *E. cassiope* inhabiting a given area is 4; that of the females inhabiting the same area is 5. If all breed we may be certain, ignoring of course other factors and exigencies, that the M of the next generation will be $4\frac{1}{2}$. Supposing that the range of variation is between 1 and 9, we know that with the M at $4\frac{1}{2}$ any of the values between 1 and 9 may occur. But if the M keeps at $4\frac{1}{2}$, as it will do if proportional numbers of each variety breed every generation, the number $4\frac{1}{2}$, being the most probable value of any unknown measure in the group—*i.e.* representing the mediocre condition—will tend to

establish itself as the typical number. (A further discussion of this will be given.)

It is plain also that if the M of $4\frac{1}{2}$ is not preserved from generation to generation owing to the inequality of the sexes, then that M has no very much better chance of establishing itself than any other. Hence a state of fluctuation.

The cases typified by (5) and (6) are, I believe, of more general application than (1) and (4); and also they demand less theoretical hypothesis for their explanation. But I found the latter more convenient to deal with at first owing to the simplicity of the figures when given in full.

I think it will be found, when dealing with actual data in reference to some particular character or characters, that the species under consideration cannot be very definitely referred to any of the six categories given above, but possesses some of the qualities of several in a not very marked degree. Also many instances will occur to the reader's mind of animals with sexes disproportionate in numbers, and yet with no marked degree of variability, &c.; but it must be remembered that only one factor in a very complex mechanism, that of heredity, is being taken into account. When the rule is stated—that equality in the number of the sexes tends towards equilibrium, *i.e.* fixation of one character or degree of a character, and that inequality when coupled with variability in the preponderating sex tends towards continued fluctuation—it must be borne in mind that this rule would be *strictly* true, only on the condition of all other factors being equal; but in nature, where interaction is universal, its particular effect may be entirely obliterated or at least modified. Nevertheless, if it is shown to hold good in theory, its possible effect must not be ignored in practice.

In the foregoing Part, a factor has, as it were, been isolated from all the other factors with which it is naturally compounded, and has, so to speak, been examined *in vacuo*. We will, in the next Part, turn to actual data, and consider them in the light of the theoretical considerations already discussed.

To recapitulate so far: equality in the numerical proportions of the sexes tends towards constancy of characters. If one sex is already constant, the variability of the other will tend to conform to the constancy of the one, owing to the prepotency of reversion. If both sexes are variable and there are no marked reversionary tendencies, then a mean will be struck between the two variabilities, which will become constant, according to the laws of chance. If, however, the sexes are very unequal in numerical proportions, and the preponderating sex is variable, whether one sex is constant or not, the variability of one or both sexes is preserved, owing to the impossibility of the laws of chance working regularly.

(To be continued.)

A LIST OF THE LEPIDOPTERA OF COUNTY CORK.

By C. DONOVAN, M.D., F.E.S., Capt. I.M.S., and R. J. F. DONOVAN.

(Concluded from Entom. xxxiv. p. 336.)

A. corticea, scarce, T.; three specimens, C. *A. nigricans*, one, the var. *fumosa*, C. *A. tritici*, common, G. and C. *A. obelisca*, about six specimens picked out by Mr. Barrett in a long series of *A. tritici* procured at C. *A. strigula*, not very common, T.; fairly common, G. *A. lucerneæ*, two near C.; a few, G. *Noctua glaucosa*, scarce, T. [*N. augur*: although Mr. Kane says this moth is to be met with throughout Ireland, we have never met with it.] *N. plecta*, common. *N. c-nigrum*, not scarce, T.; common at G., and especially so at C., in the autumn brood, about September. *N. triangulum*, rather scarce, T.; few, G.; several, C. *N. brunnea*, fairly common. *N. festiva*, one, T.; few, G., and near Bandon; several, C. *N. dahlii*, two specimens at G. *N. rubi*, fairly common. *N. umbrosa*, a few specimens. *N. baia*, one, T.; few, C.; common near Dunmanway and G. *N. xanthographa*, very common. *Triphaena ianthina*, fairly common. *T. fimbria*, scarce. *T. interjecta*, four specimens, T.; common, G. and C. *T. comes*, common. *T. pronuba*, very common. *Amphipyra pyramidea*, a number of specimens in 1901, T.; common, C.; as many as a dozen on a sugared tree. *A. trago-pogonis*, common. *Mania typica*, one, T.; few, G.; and near Bandon. *M. maura*, one larva, T.; few, G. *Panolis piniperda*, three specimens, T. *Pachnobia rubricosa*, scarce, T.; few, near Bandon. *Tæniocampa gothica*, common, T., and near Bandon. *T. incerta*, rather scarce, T., and near Bandon. *T. stabilis*, common, T., and near Bandon. *T. gracilis*, scarce, T., few near Bandon. *T. pulverulenta*, common, T. *Orthosia lota*, not common, T.; common at G., and near Bandon. *O. macilentæ*, not so frequently met with as the preceding species, T.; common, G. *Anchocelis pistacina*, fairly common, T. *A. lunosa*, not common, T.; several, G. and C. *Cerastis vaccinii*, common, T. and G. *Scopelosoma satellitia*, common, T., G., and near Bandon. *Xanthia flavago*, rather scarce, T.; few near Bandon. *X. circellaris*, common. *Cirrhædia xerampelina*, two specimens, G. *Calymnia trapezina*, rather plentiful, T.; several, C. *Dianthæcia luteago* var. *barrettii*, two specimens near C.; the first a couple of years ago, identified by Mr. Kane; the second procured this year, concerning whose identity there was considerable doubt, has now been definitely pronounced by Mr. Barrett to be this species. *D. cæsia*, few, C.; several, G. [*D. nana*.—Mr. Kane in his Catalogue, has attributed to me (C. D.) the captures of this species at G. I do not recollect the moth, nor does my register contain any record of the occurrence.] *D. capsicola* and *cucubali*, common. *D. capsophila*, common on the coast, as well as some

four miles inland. *Hecatera serena*, rather scarce, T.; several, G.; common, C. [*Polia chi*.—Although said to be widely distributed and frequently common, it has never been procured by us.] *Miselia oxyacanthæ*, fairly common. *Agriopis aprilina*, one, T.; several, G.; and near Bandon. *Euplexia lucipara*, common. *Phlogophora meticulosa*, very common; we have counted as many as thirty-four on one tree, and twenty-one on another, at sugar at C., on a night in September of this year. *Aplecta prasina*, scarce, T.; several, G. and C. *A. nebulosa*, common; all of the pale whitish grey coloration. *Hadena dentina*, common. *H. dissimilis*, scarce, T. *H. oleracea*, common. *H. thalassina*, not common, T.; common, G.; several, C. *Xylocampa areola*, common, T., and near Bandon. *Calocampa vetusta*, common, T. and G. *C. exoleta*, scarce, T.; several, G. *Xylina ornithopus*, scarce, T.; several, G. *X. socia*, common, T. and G.; one, C. *Cucullia verbasci*, three imagines captured and the larvæ plentiful this year at T., on *Scrophularia aquatica*, and some on *Verbascum thapsus*; two larvæ on *Scrophularia nodosa*, at Castlefreke, near Rosscarberry. Prior to the present year the conspicuous larvæ were never noticed; there must have been a recent immigration of the moth. (Mr. Kane is doubtful whether our moth is *verbasci* or *scrophulariæ*). *C. absinthii*, two imagines, T.; larvæ very plentiful this year, both on *Artemisia absinthium* and *vulgaris*, in about twenty localities within a six miles radius of C. *C. umbratica*, common. *Gonoptera libatrix*, fairly common. *Habrostola tripartita*, scarce, T.; several, C. and G. *H. triplasia*, common. *Plusia chrysitis*, common. *P. bractea*, one, T.; several, G. and two localities near Bandon. *P. festuæ*, common, T. and C.; one near Bandon. *P. pulchrina*, scarce, T. and G. *P. gamma*, very common. *Anarta myrtilli*, larvæ not uncommon, T.; several imagines, G. *Heliothis peltigera*, one, G. *Chariclea umbra*, not scarce, T.; few, C. *Erastria fasciana*, two specimens near G. *Phytometra viridaria*, common, T. and G. *Euclidia mi*, not common, T. and G. *Rivula sericealis*, common, T.; several, C. *Zanclognatha grisealis*, common. *Z. tarsipennalis*, scarce, T.; one, C. *Bomolocha fontis*, scarce, T.: one, G.; two, C. *Hypena proboscidalis*, common.

GEOMETRÆ.—*Uropteryx sambucaria*, common. *Epione apicaria*, scarce, T.; few, G. *Rumia luteolata*, very common. *Venilia macularia*, common, T.; near Bandon. *Metrocampa margaritaria*, common. *Ellopiæ prosapiaria*, rather scarce, T.; several, G.; few, Dunmanway. *Eurymene dolobraria*, several, T.; three, C.; few, Dunmanway. *Selenia bilunaria*, common, in both broods. *Odontopera bidentata*, common. *Eugonia alvina*, one, T. *E. quercinaria*, common, T. and G.; one, C. *Himera pennaria*, fairly numerous, T.; several, near Bandon. *Phigalia pedaria*, scarce, mostly met with in pupal state, T.; one, G. *Amphidasys strataria*, a few males at light, and a single

female at rest, from whom ova were obtained, *T. A. betularia*, larvæ and pupæ, plentiful, T.; few, G. *Cleora lichenaria*, fairly common. *Boarmia repandata*, common. *B. cinctaria*, one specimen, T. *Tephrosia biundularia*, common, G. and C.; few, near Dunmanway. *Gnophos obscuraria*, not common. *Pseudoterpna pruinata*, common. *Geometra papilionaria*, two larvæ and one imago, T.; several, G.; common, near Dunmanway. *Iodis lactearia*, very common. *Hemithea strigata*, one, T.; single specimens, near Bandon, Drimoleague, and G.; several at C. *Zonosoma linearia*, one, T. *Acidalia dimidiata* and *bisetata*, common. *A. marginepunctata*, not common, T.; common, G. and C. *A. subsericeata*, not uncommon, T.: several, G.; common, C. *A. remutaria*, few, G. *A. imitaria*, common. *A. aversata*, common. *Cabera pusaria* and *exanthemata*, common. *Macaria liturata*, scarce, T. *Panagra petraria*, one, T.; two, G. [*Scodiona belgiaria*.—By mistake, Mr. Kane gives my name (C. D.) against this insect; the entry should be transferred to the next species.] *Selidosema eriectaria*, one, T.; several, G. *Ematurga atomaria*, common on heaths. *Bupalus piniaria*, one specimen, dusking on May 27th, 1900, T. *Sterrhia sacraria*, one specimen at ragwort on Aug. 27th, 1898, T.; seen by Mr. Kane. *Abraxas grossulariata*, very common. *Lomaspilis marginata*, common. *Hybernia marginaria*, not uncommon at sallow blossom, T. *H. defoliaria*, a few imagines and pupæ, T. *Anisopteryx æscularia*, fairly common, T. *Cheimatobia brumata*, common, T., G., and near Bandon. *Oporabia dilutata*, common, T., G., and near Bandon. *Larentia didymata*, scarce, T., C.; common, G. *L. multistrigaria*, common, T. *L. viridaria*, common, especially inland. *Emmelesia alchemillata*, three specimens, T.; few, G. *F. albulata*, locally abundant, T. *E. unifasciata*, several, T. and C. *Eupithecia venosata*, common, a melanic variety at G. *E. pulchellata*, rather scarce, T.; common, G. *E. oblongata*, common, T. and C. *E. subfulvata*, scarce, T.; few, C. *E. plumbeolata*, scarce, T.; fairly plentiful in a small wood near Dunmanway. *E. scabiosata*, common, T.; few, C. *E. pygmæata*, one specimen beaten out of oak on June 24th, 1900, T. *E. satyrata*, a few specimens, T. and C. *E. castigata*, fairly common, T. and C. *E. jasionæata*, common by the sea, C. *E. virgaureata*, common, T. and C. *E. valerianata*, common, T. and C. *E. indigata*, one specimen, May 18th, 1900, T. *E. constrictata*, larvæ locally common, C. *E. nanata*, fairly common, T.; one, C. *E. vulgata*, common. *E. albipunctata*, larvæ plentiful on *Angelica sylvestris*, T. *E. absinthiata*, common, T. and C. *E. assimilata*, few larvæ and imagines, T. *E. tenuiata*, two larvæ in sallow catkins, T. *E. lariciata*, rather scarce, T. *E. abbreviata*, common, T. and C. *E. togata*, larvæ plentiful in spruce fir-cones, T., and near Dunmanway. *E. pumilata*, common. *E. coronata*, scarce, T. and C. *E. rectangulata*, fairly common. *E. debiliata*, larvæ plentiful, T.

Lobophora viretata, very common, T. and C. *Thera variata*, common. *Hypsipetes trifasciata*, pupæ not scarce in rotten alder wood, T. *H. sordidata*, rather scarce, T.; common, G., Drimoleague and Dunmanway. *Melanthia bicolorata*, common, Drimoleague and Dunmanway. *M. ocellata*, common. *M. albicillata*, scarce. *Melanippe sociata* and *montanata*, common. *M. galiata*, fairly common, C. *M. fluctuata*, very common. *Anticlea badiata*, one specimen near Bandon. *Coremia unidentaria*, common; we have made no attempt to discriminate between this species and *ferrugata*. *Camptogramma bilineata*, very common. *C. fluviala*, a few specimens, T. *Phibalapteryx vittata*, not common. *Eucosmia undulata*, scarce, larvæ more plentiful than imagines, T.; few, G.; fairly common, Drimoleague and Dunmanway. *Cidaria siderata*, common. *C. miata*, scarce, T. and G. *C. corylata*, one specimen, T. *C. truncata* and *C. immanata*, common. *C. suffumata*, fairly common, T. and C. *C. prunata*, scarce, T. and C. *C. testata*, not common, T. and G. *C. populata*, fairly common, T. and G. *Pelurga comitata*, not common, T. and C. *Eubolia limitata*, very common. *E. plumbaria*, common. *Anaitis plagiata*, common.

PYRALIDES.—*Pyralis farinalis*, common, T.; few, C. *Scoparia ambigualis*, *S. basistrigalis*, *S. cembra*, *S. dubitalis*, *S. mercurella*, *S. cratægella*, *S. resinea*, *S. angustea*. *Nomophila noctuella*. *Pyrausta ostrinalis*. *Herbula cespitalis*. *Ennychia octomaculata*. *Eurrhyncha urticata*, very common. *Scopula lutealis*, *S. prunalis*, *S. ferrugalis*. *Botys ruralis*, *B. fuscalis*, common. *Eubolea crocealis*. *Pionea forficalis*, common. *Orobena straminealis*.

PTEROPHORI.—*Platyptilia ochrodactyla*, *P. bertrami*, *P. gonodactyla* (?). *Amblyptilia acanthodactyla*. *Mimæseoptilus bipunctidactyla*, *M. pterodactylus*. *Edematophorus lithodactylus*. *Pterophorus monodactylus*. *Leioptilus tephrodactylus*. *Aciptilia pentadactyla*, very common. *Alucita hexadactyla*, common.

CRAMBI.—*Schœnobia forficellus*. *Crambus pratellus*, *C. perlellus*, *C. tristellus*, *C. inquinatellus*, *C. geniculens*. *Homœosoma binœrella*. *Ephestia kühniella*. *Phycis fusca*, *P. adornatella*. *Nephopteryx splendidella*, scarce in spruce fir-cones, T., and near Dunmanway. *Rhodophea consociella*. *Aphomia sociella*, common. *Achreagraisella*.

TORTRICES.—*Dichelia grotiana*. *Tortrix podana*, *T. xylosteana*, *T. heparana*, *T. unifasciana*, *T. costana*, *T. viridana*, common. *T. forsterana*. *Leptogramma literana*. *Peronea sponšana*, *P. comparana*, *P. perplexana*, *P. variegana*, *P. hastiana*, *P. ferrugana*, *P. aspersana*. *Rhacodia caudana*. *Teras contaminana*. *Dictyoptyx læflingiana*. *Argyrotoxa conwayana*, common. *Ptycholoma lecheana*. *Penthina variegana*, *P. marginana*. *Hedya dealbana*. *Spilonota incarnata*. *Pardia tripunctana*. *Aspis udmanniana*. *Sericoris littoralis*, *S. lacunana*. *Orthotenia ericetana*. *Cnephasia musculana*. *Sciaphila conspersana*, *S. subjectana*, *S. virgaureana*, *S. colquhounana*, common on

rocks by the sea, C. ; the larvæ feed on *Armeria vulgaris*, in long silken tubes, entwined among the leaves and stems of the plant. There is marked variation, ranging from nearly white to a dark stone-grey. *Capua favillaceana*. *Bactra lanceolana*. *Phoxopteryx lundana*. *Grapholitha nisella*, *G. nigromaculana*, *G. trimaculana*, *G. penkleriana*, *G. nevana*. *Phloxodes immundana*. *Pædisca corticana*, *P. profundana*, *P. semifuscana*. *Ephippiphora pflugiana*, *E. brunnichiana*, *E. trigeminana*. *Coccyx argyran*, *C. tædella*. *Stigmonota regiana*. *Dicrorampha alpinana*, *D. herbosana*. *Catoptria ulicetana*, *C. hypericana*, *C. cana*, *C. citrana*. *Symæthis oxyacanthella*. *Eupœcilia pallidana*, *E. angustana*, *E. ciliella*. *Xanthosetia zoegana*, *X. hamana*. *Argyrolepis hartmanniana*. *Conchylis straminea*.

ON REARING *AGROTIS ASHWORTHII* AND *ACIDALIA CONTIGUARIA*.

By R. TAIT.

My annual visit to North Wales was made rather later than usual this year, and I did not reach Penmaenmawr until July 17th, by which time imagines of *A. ashworthii* were practically over. I did not find one, although a careful search was made; but Mr. W. G. Sheldon (who was staying at Penmaenmawr) was more fortunate, and captured two or three specimens at rest.

However, ova were fairly plentiful, and I decided to try and force them again. The results were fairly satisfactory, as I managed to get some sixty odd perfect insects, and should have had more, but for an illness which stopped the feeding of the larvæ just when many of them were almost full-grown. Two batches of ova failed to hatch at the same time as the others, although they changed colour; but eventually they produced a fine brood of minute ichneumons.

A. contiguaria was taken sparingly by both Mr. Sheldon and myself, and I succeeded in obtaining a few ova. About sixty hatched, and by keeping them in the same temperature as the *A. ashworthii* I got about forty odd into pupæ by the end of August. They began to emerge on Sept. 8th, and between that date and the 23rd forty-four specimens came out, and were duly killed and set. Fully half of these were of the dark form, probably the progeny of a dark female; but as the ova were all put together, I cannot speak definitely on this point.

The moths pair easily, and I have now a nice batch of larvæ hibernating on heather.

I may add that I also forced a batch of *Noctua festiva* under the same conditions as *A. ashworthii*; these emerged during the last fortnight in October.

A NEW GENUS OF SOUTH AFRICAN COCCIDÆ.

By T. D. A. COCKERELL.

HALIMOCOCCUS, n. gen.

A Dactylopiine Coccid enclosed in a horny sac shaped like that of *Solenococcus*, without legs or antennæ in the adult. Larva with no rows of dorsal spines, no hairs on anal ring, and no caudal tubercles, but four long caudal bristles as in *Phœnicococcus*. Closely related to *Phœnicococcus* (which lives in Algeria), but distinguished by the form of the sac, which exactly imitates that of *Solenococcus*.

HALIMOCOCCUS LAMPAS, n. sp.

♀. Enclosed in a dark brown horny sac (which is not dissolved by liquor potassæ), which is shaped like a *Terebratula* shell, *i.e.* oval, with the end raised and terminating in an orifice. Length of sac 510μ , breadth 300, breadth of orifice about 66μ . The orifice is closed by a reticulated plate, except basally, where there is a semilunar opening. In immature examples the sac is prominently segmented on the ventral side.

♂. Scale small, cylindrical, horny, ferruginous, of the same texture as that of the female, but usually somewhat paler. Length 350μ , breadth 140. The end comes off, leaving a round opening, as in Muscid pupæ.

♀. A mere bag, with well-developed mouth and spiracles.

Larva.—Rather narrow; legs and antennæ present. No caudal tubercles, but two pairs of long caudal bristles; two small bristles close to these. Antennæ about 45μ long, six-jointed, last joint much the longest. No dorsal spines. Last antennal joint with two long bristles. Femur remarkably stout, about 15μ broad; length of femur + trochanter about 30μ .

Older specimens have actually shorter (36μ) antennæ, with joint 6 longer than $4+5$; 5 longer than 3, 3 longer than 4, 1 large.

A few white curled waxen threads protrude from beneath the sacs of the females.

Hab. In great numbers on upper sides of leaves of palm on the coast of Natal (Claude Fuller, No. 3). A remarkable insect, essentially a modification of the *Phœnicococcus* type. With *H. lampas* in Natal, and *P. marlatti* in Algeria, it is not difficult to imagine the existence of a whole series of such forms in the vast intermediate region, the coccids of which are almost wholly unknown.

East Las Vegas, New Mexico, U.S.A.

Nov. 1st, 1901.

INSTRUMENT WITH WHICH MOTHS OF THE GENUS
ANTHERÆA CUT OUT OF THEIR HARD COCOONS.

By F. P. DODD.

I AM not aware that any Australian entomologist has yet discovered how these silk-producing moths contrive to work their way out after bursting the pupa-shell. Many believed they managed it with their woolly prolegs, aided by the liquid they discharge to soften the material during the cutting process. A more reasonable supposition would have been that the powerful wing-veins near base performed the work, for a large percentage of the moths have the scales of fore wing for one-fourth or three-eighths of an inch from base completely rubbed off, giving the insects quite a shabby appearance, though perfect in every other way. Again, the insect whilst working seems to be employing the fore wings, apparently striking with one for a time, then the other.

However, Dr. A. J. Turner informed me that he was one day watching an *Antheræa simplex* cutting out, and observed that it did so with a pointed instrument, like the end of a small bradawl; but the insect having emerged, he did not see this again. As he was aware that I was breeding out several species, he expressed a wish that I should keep a watch when an opportunity arose. I was soon able to prove that there is a cutting "weapon," which our collectors appear to have failed to observe; but that is not strange, for, as the moth comes into view, his work is nearly completed, and there is little necessity for him to use the "cutter." This is a short hard black and curved thorn, situated in the thick joints at base of fore wings, one on each side; in a rubbed specimen the thorn is easily discernible, but in a good one it is concealed amongst the dense scales. This thorn is present in all my species; it can at once be felt in any specimen. It would be interesting to know whether anyone can state whence the liquid issues which the moth discharges to soften the cocoon where he cuts through; it must issue from near the thorn, for, as a rule, the scales left at base of the wing and alongside of the thorax are wet and matted when the moth emerges.

The cutting operation takes a considerable time—several hours; I have known *A. loranthi* to commence work at 2.30, and still be cutting at 7 o'clock, the constant "clicking" being heard several yards away. This species, besides having its cocoon to cut through, has the "community covering" to negotiate as well—an extra one-fourth or three-eighths of an inch of tough but loose material. When about to change the larvæ bunch together at the butt of the loranthus, and set to work together to spin a great outer web, which envelopes them. When this is completed each insect then constructs a cocoon, which is very thick and harder than those of *A. eucalypti*, *ianetta*, or *helenææ*.

One of these cocoon-masses* is forwarded, but some are larger; from a larger one I obtained seventeen moths. The cocoons are so placed that each moth can get out—at least, that is my experience.

ORNITHOPTERA CASSANDRA AND O. RICHMONDIA.

By F. P. DODD.

SOME entomologists are not quite satisfied that these fine butterflies are distinct, for they are so alike in their larval and perfect stages; the larvæ feed on *Aristolochia* of different species, and the males of both have the strange habit of frequently flying in pairs, it being quite a common sight to see a male of either closely followed by another. A writer in the 'Victorian Naturalist' mentions this peculiarity in *richmondia*, and I have noticed it myself in the Brisbane district.

With the larger and northern species *cassandra*, I am familiar in all its stages. From an article which I read in the 'Entomologist' several years ago, I can state that the eggs are identical in colour; the larvæ present a few slight differences, the principal being that *cassandra* is generally darker, and without a trace of the "invisible green" discernible in *richmondia*. The pupa of the latter is vivid green, as mentioned in the article referred to, and as seen by myself upon one occasion in the Brisbane Museum.

Cassandra chrysalis may be mentioned as being of a light brown underneath, and yellow above, between the wings and along to tip of abdomen. Pupæ in my boxes occasionally varied in a slight degree in the yellow colouring, and pupæ taken on green leaves in the bush were identical with mine. Therefore, I presume, such a wide and constant difference in the colour of the pupæ of the two butterflies is sufficient to prove that they are entirely distinct. A healthy pupa of *cassandra* is being forwarded to Dr. Turner, which may safely reach England. Most of the others of a brood produced imagines in May; this and several others still left were no doubt destined to outlast the long dry period we have between March and December or January. During some years' residence in Townsville, I have never seen the butterfly before December; so I hope that this particular chrysalis may be viewed by some of the entomologists of London. Should it emerge, an empty shell is also sent, which shows the colouring of a living chrysalis fairly well.

Warburton Street, Townsville, Queensland.

* This reminds us somewhat of a cluster of cocoons of *Aphomia sociella*, but the silk of which it is composed is coarser.—ED.

DESCRIPTION OF TWO NEW GENERA AND THIRTEEN NEW SPECIES OF ICHNEUMONIDÆ FROM INDIA.

By P. CAMERON.

TORBDA, gen. nov.

Head cubital, largely developed behind the eyes, which are large and parallel; the malar space is large. Clypeus not distinctly separated from the face by a furrow; its apex transverse. Labrum largely projecting. Mandibles stout, their apex bidentate. Parapsidal furrows distinct at the base. Pronotum tuberculate in the middle. Mesosternum indistinctly furrowed laterally behind. Median segment large, rounded behind; there is one transverse keel at the base; the spiracles are linear, not elongated. Areolet large, longer than wide; the transverse cubital nervures slightly converging above; there is no stump of a nervure on the disco-cubital nervure; the transverse median nervure is received behind the transverse basal; the transverse median nervure in the hind wings is broken at the middle. Legs elongate, stout; the tarsi spinose; the fore tarsi are longer than the tibiæ; all the tarsi are thickly spinose. Petiole stout, narrowed at the base; the spiracles are placed almost in the middle; the penultimate segment is largely developed, is nearly as long as the four preceding segments united; the last segment is distinctly longer laterally than the penultimate; its apex is depressed and clearly separated; the cerci are long. The antennæ are long and stout; the second and third joints are equal in length; the fore tibiæ are distinctly narrowed at the base; the claws are simple; the occiput is broadly incised, and has a distinct but not sharp margin; the scutellum is large, rounded, and hardly raised above the level of the mesonotum; the hinder coxæ are large, about three times longer than thick; the scutellar keels are thick. The areolet is pentagonal, it being angled where the recurrent nervure is received. In *T. femorata*, and in the luteous section of the genus, the apex of the clypeus is obliquely depressed; in the male of that species the hinder tarsi are longer compared to the tibia.

I am not quite certain as to the exact location of this genus, or if it should form one or two genera. It has some affinity with the Cryptina. The position of the spiracles on the petiole separates it from the Cryptina. The very large hypopygium is somewhat as in the Acoenitini, but it cannot be referred to any of the described genera in that group. The depressed clypeus in some of the species is similar to what it is in the Xoridini, and they have some relationship to *Echthrus*. Probably the natural position of *Torbda* is with the Xorides. The species are very large and handsome—among the largest of the Ichneumonidæ.

- A. Black, with white markings; the legs fulvous, marked with black and white.
1. Post-scutellum raised, depressed only laterally at the base. Wings suffused with fuscous or violaceous, not maculate. Large species.

- a. Hinder femora and tibiæ fulvous.
 Posterior knees and apex of tibiæ black ; the scutellum black, its apex white . . . *geniculata*, Cam.
 Posterior knees and apex of tibiæ not marked with black ; the scutellum white, with a black line in the centre at the base . . . *violaceipennis*, Cam.
- b. Posterior femora and tibiæ for the greater part black
femorata, Cam.
2. Post-scutellum widely hollowed ; the fore wings with a cloud at the base of the subdiscoidal nervure ; the areolet smaller, and receiving the recurrent nervure in the middle ; the cubital nervure at the base roundly curved, not straight, oblique and parallel with the basal . . . *maculipennis*, Cam.
- B. Fulvous, marked with black ; the recurrent nervure is received at the base of the apical third of the cellule ; the lower part of the cubital nervure at the base straight, oblique and parallel with the basal ; the basal half of the petiole distinctly narrowed ; the top and lower side of the petiole sharply margined. Clypeal suture distinct.
- Wings brassy ; the stigma rufo-testaceous ; the abdominal segments lined with black at the base only ; the apical segment with a small triangular depression in the middle, from which an obscure furrow runs obliquely down the sides . *fulgidipennis*, Cam.
- Wings smoky, paler at the base ; the third and following segments of the abdomen deep black ; the last dorsal segment with an elongate depression down the middle . . . *apicalis*, Cam.

TORBDA FULGIDIPENNIS, sp. nov.

Ferruginea, thorace abdomineque nigro-maculatis ; alis fulvo-fumatis ; stigmatibus fulvis ; nervis nigris ; pedibus ferrugineis ; coxis posterioribus nigro-maculatis. ♀. Long. 23 mm. ; terebra, 13 mm.

Hab. Khasia (coll. Rothney).

TORBDA APICALIS, sp. nov.

Ferruginea ; maculis thoracis, apice antennarum late, apice abdominis terebraque nigris ; alis violaceo-hyalinis, stigmatibus nigris. ♀. Long. 18 mm. ; terebra, 11 mm.

Hab. Khasia (coll. Rothney).

TORBDA GENICULATA, sp. nov.

Nigra, capite, thorace abdomineque albomaculatis ; pedibus fulvis, trochanteribus, geniculis apiceque tibiæ posticarum late nigris ; coxis albis, nigro maculatis ; alis fulvo-hyalinis, nervis stigmatibus nigris. . Long. 23 mm. ; terebra, 13 mm.

Hab. Khasia (coll. Rothney).

TORBDA VIOLACEIPENNIS, sp. nov.

Nigra, facie, orbitis oculorum late thoraceque albomaculatis ; pedibus fulvis ; coxis nigris, albomaculatis ; alis violaceo-fumatis ; nervis stigmatique nigris. ♀. Long. 25 mm. ; terebra, 10 mm.

Hab. Khasia (coll. *Rothney*).

TORBDA FEMORATA, sp. nov.

Nigra, late albo-maculata ; pedibus fulvis ; coxis trochanteribusque albis ; coxis, femoribus dimidioque apicali tibiæ posticarum nigris ; tarsis posticis albis, basi nigro ; alis fusco-hyalinis, nervis stigmatique nigris. ♂. Long. 22 mm.

Hab. Khasia (coll. *Rothney*).

TORBDA MACULIPENNIS, sp. nov.

Nigra, capite, thorace abdomineque albo-maculatis ; pedibus fulvis ; coxis anticis albis, posterioribus nigris, basi albis ; alis hyalinis, stigmatique nigris. ♀. Long. 14 mm. ; terebra, 6-7 mm.

Hab. Khasia (coll. *Rothney*).

COLGANTA, gen. nov.

Areolet large, wider above than below ; the transverse basal nervure interstitial or nearly so ; in the hind wings the transverse median nervure is broken below the middle ; the radial cellule elongate, narrow. Antennæ stout, stouter at the apex than at the base ; the basal joints of the flagellum greatly elongated. Eyes large, almost parallel, widely distant from the base of the mandibles. Clypeus not clearly separated by a suture from the face ; the mandibles short, thick, bidentate at the apex. Labrum minute. Palpi long. Parapsidal furrows obsolete. Scutellum keeled laterally. Median segment with two curved keels at the base ; its spiracles large, linear, oblique. Petiole longer than the second segment, distinctly dilated at the apex ; the spiracles are placed near the base of the post-petiole, as in *Ichneumon* ; there are eight segments ; the ovipositor projects. Legs stout ; the tarsi spinose ; the claws large, curved, simple. In the only known male the antennæ are serrate, densely pilose, and taper perceptibly towards the apex. The head is obliquely narrowed behind, and has the occiput sharply keeled. The pterostigma is elongate, narrow.

The systematic position of this genus is not very clear. Only two views are tenable ; it either forms a new tribe, or it forms a new subtribe of the Cryptina. It has a furrow on the lower part of the mesopleuræ, as in the Cryptina, and the female has the exserted ovipositor of that group, but it wants the parapsidal furrows ; the transverse cubital nervures are oblique, and converge towards the bottom, while in the Cryptina they are either straight or converge towards the top. The form of the metanotal keels is different from what it is with the Cryptina ; in that group they are straight, transverse, and do not form an areæ. In the present group they are interrupted, and bent backwards, so that two complete areæ are formed.

COLGANTA NIGRO-MACULATA, sp. nov.

Lutea, antennis nigris, flagello late albo annulato; mesonoto, femoribus, tibiis tarsisque posticis nigris; alis fulvo-hyalinis; nervis stigmatæque nigris. ♀. Long. 15 mm.; terebra, fere 3 mm.

Hab. Sarawak, Borneo (*Shelford*).

Antennæ black, the sixth to nineteenth joints white. Head luteous; the vertex broadly in the middle and the greater part of the occiput black; the face is wrinkled in the centre; the sides bear large round clearly separated punctures; the mandibles are broadly black at the base. Thorax luteous, the sides paler in tint; the mesonotum and the sides of the median segment at the base black; the mesonotum is closely punctured; the scutellum is thickly covered with long black hair; the scutellum is keeled to near the apex. The median segment is wrinkled; the basal keels are straight at the base; the rest of them are irregularly twisted and curved towards the edges of the segments, where they join a straight lateral outer keel, a large enclosed area being thus formed, which is about twice longer than broad. Propleuræ punctured above, the middle obliquely striated. Mesopleuræ smooth and shining; the metapleuræ with the lower apical part stoutly obliquely striated. The four front legs are coloured like the body, with the middle femora darker above; the hind legs black; the coxæ and the basal joint of the trochanters luteous; the coxæ are marked with black at the apex above. The apex of the petiole and the other abdominal segments are for the greater part fuscous-black above.

COLGANTA RUFIPES, sp. nov.

Nigra; pedibus rufis; tibiis posticis nigris; alis fulvo-hyalinis. ♀. Long. 15 mm.; terebra, 4 mm.

Hab. Borneo.

Antennæ black, the eighth to seventeenth joints white beneath; the apical joints brownish. The face roundly projects in the middle, and is there closely but not strongly punctured; the sides bear large deep punctures, and are irregularly striated on the inner side; the malar space is brownish; on the lower inner orbits is a pale yellowish mark. Mesonotum and scutellum closely punctured; the apex of the scutellum and the post-scutellum pale testaceous. The base of the median segment is closely punctured and irregularly striated; the middle of the apical slope of the segment is closely, irregularly striated; the sides are coarsely, irregularly reticulated; the lower outer part bears four stout keels, and is bordered by keels on either side. The lower half of the propleuræ is stoutly keeled; the mesopleuræ almost smooth; the metapleuræ closely, obliquely striated on the apical half. Legs rufous; the apex of the hinder femora, the tibiæ, and the base of the hinder tarsi black; the rest of the hinder tarsi white. Abdomen black; the apical two segments white above.

This genus is probably well represented in Northern India. The species known to me from the Khasia Hills may readily be recognized by the following table. They are all fulvous or ferruginous in colour.

- 1 (8) Areolet distinctly narrowed on the lower side; the nervures oblique.
- 2 (5) The tarsi not black, at most only slightly annulated with black.
- 3 (4) Wings hyaline, suffused yellow or fulvous; the antennæ pale yellow, the apex broadly black. Length, 12 mm.; terebra, 4 mm. *fulvipennis*, Cam.
- 4 (3) Wings dark violaceous; the antennæ blackish, annulated with dark fulvous. Length, 16 mm. ♂
 *fulgidipennis*, Cam.
- 5 (2) The tarsi black.
- 6 (7) The tibiæ black. Length, 12 mm. ♂ *tibialis*, Cam.
- 7 (6) The tibiæ not black. Length, 12 mm. ♂ *tarsalis*, Cam.
- 8 (1) Areolet not distinctly narrowed on the lower side; the nervures straight. Length, 12 mm.; terebra, 2 mm. *tuberculata*, Cam.

DESCRIPTION OF A NEW GRASSHOPPER FROM NATAL (*POMATONOTA BIPUNCTATA*, KIRBY.)

BY W. F. KIRBY, F.L.S.

AMONG some Orthoptera recently received by Mr. Distant from Natal, collected by Mr. A. Ross, I found a pair which appear to belong to a new species allied to *Pomatonota dregii*, Burm. This is a small green species, with very long legs, belonging to the family Mecopodidæ, and the subfamily Moristinae. The wings are short and broad in the fully developed insect; but in the only specimen of *P. dregii* at present in the Natural History Museum they are only just visible under the shield. The types of *P. bipunctata* are also apterous or subapterous. Whether the specimens before me are immature, or whether they are micropterous specimens of a dimorphous species, we must wait for more specimens to decide. A description is given below.

POMATONOTA BIPUNCTATA, sp. n.

♂. Long. corp. 20 mm.; capit. et pron. 13 mm.; fem. post. 20 mm. ♀. Long. corp. 17 mm.; capit. et pron. 10 mm.; fem. post. 14 mm.; ovip. 15 mm.

Size and general shape of *P. dregii*, Burm. Brown, with a slight reddish or coppery lustre, especially on the face; mandibles smooth, shining, pale orange; hinder edge of the pronotum marked with two large black spots, and a few smaller ones beyond and on the disc; abdomen with some longitudinal rows of black dots, and with a purplish and black oblong mark at the base on each side; wings in male blackish, half hidden by the shield, somewhat as in the European genus *Ephippiger*, which this species also resembles in the long slender upcurved ovipositor.

The colour, and especially the two conspicuous black spots at the extremity of the pronotum, besides the form of the ovipositor, will sufficiently distinguish the present species from *P. dregii*. From *Ephippiger*, which belongs to another family, the structural characters, such as the open foramina and the two spines on the prosternum, will distinguish it at a glance.

One pair of this rather remarkable insect, which will be figured in a forthcoming part of Mr. Distant's 'Insecta Transvaaliensia.'

NOTES AND OBSERVATIONS.

ABERRATION OF *VANESSA URTICÆ*.—The Reverend Archibald Day has been good enough to send for inspection a well-executed coloured drawing of a variety of *V. urticæ* that he captured at Storridge, near Malvern, in Worcestershire, on September 26th, 1901. It is a modification of the aberration of this species figured in the 'Entomologist,' vol. xxxiii. pl. iii. fig. 1, but differs from that specimen in having the outer margin of all the wings normally angulated; the outer marginal area of the fore wings is more variegated, and there are some rather large blue submarginal spots on the hind wings. There is a blue spot between second and third median nervules of fore wing, placed farther from the margin than the normal blue spots in typical *V. urticæ*.

AUTUMNAL PUPATION OF *CERIGO CYTHEREA*.—I have a number of larvæ of *C. cytherea* which I am endeavouring to get through the winter; they are all about an inch in length, excepting two, which fed up rapidly to a large size and have subsequently pupated. It would be interesting to know if it is the rule for this species to pupate in the late autumn, as I believe they are commonly known as hibernators.—A. J. LAWRENCE; Bromley Common, Kent.

THIRD BROOD OF *PHRAGMATOBIA FULIGINOSA*.—On May 5th last I had a female *P. fuliginosa* sent me by a friend, and on the 8th she laid between thirty and forty whitish eggs. These began to hatch on May 23rd, a dark speck having appeared two days before in each egg, which gradually spread over the whole, making it appear of a dark grey colour. All of them hatched out by next day. The caterpillars were then of a dark greyish colour, most difficult to distinguish from their food-plant. They fed well on dock, eating the lower membrane, and lying on the under side of the leaf along the veins. From some cause, possibly being too dry at their first moult, their number was on the 29th reduced to six; they were then covered with light reddish hairs, but this tint on June 1st became much darker, so that there was no further difficulty in seeing them. They grew fast, and five ultimately spun up about the end of June; unfortunately I omitted to make a note of the exact days. They were, however, about eighteen days in the pupa state, and the first moths emerged on July 18th. They proved to be a pair, and again I had a batch of between forty and fifty fertile eggs. The larvæ began to emerge on July 29th, and

all came out on that and the following day. I have so far been successful in rearing most of these. They varied considerably in size from the first, and by the end of September ranged from one-half to one inch in length, some of them apparently being at least a moult behind others. The colour of the hair of those similarly advanced also varied from light reddish to dark brown, the latter being by far the commoner; and it will be interesting to note whether the imagos will differ in the same way. Two spun up on Sept. 25th and 26th, but the remaining caterpillars, thirty-four in number, continued to feed until the end of October, and are now hibernating. The two that pupated in September emerged on Oct. 23rd and 27th respectively, but unfortunately were not a pair. They have been kept in a corner of a room facing east, with the window generally open.—JAMES DOUGLAS; Sherborne.

ON THE HABITS OF *MACROTHYLACIA (BOMBYX) RUBI*.—In 'The Lepidoptera of the British Islands,' Mr. Barrett says concerning the larvæ of *Macrothylacia (Bombyx) rubi*, "It feeds vigorously through the summer, becoming full grown in the late autumn, when it reposes at full length on any plant or on the ground in the sunshine." My experience is that it never appears until after the sun has gone down. There is a field near here where they are abundant, but although I have searched, I have never found one in the sunshine; but immediately after the sun has gone down I could collect fifty or a hundred with ease. I am only referring to the late autumn; in the early spring I have no doubt that they come out in the sunshine, but I have not yet had an opportunity of finding this out. Mr. Newman says that the hairs of the caterpillar are abundantly intermixed in the cocoon. This also I have not found to be the case, although I must confess that my experience of the cocoon is limited to three or four.—L. M. SETH SMITH; Alleyne, Caterham Valley, Surrey, Nov. 13th, 1901.

CAPTURES AND FIELD REPORTS.

SPHINX CONVULVULI IN DORSETSHIRE.—During the month of September last I took twenty-nine *S. convulvuli*, flying about tobacco-flowers at dusk; they appeared each night the same length of time after the sun had set, practically to a minute. Those taken at the beginning of the month were much the larger, though not in such good condition. Two females in this batch measured no less than 124 mm. and 127 mm. respectively across the wings; the largest male 113 mm. The extreme given by Meyrick is 118 mm. Males were also much scarcer, numbering only six out of nineteen, while of ten last taken four were males. These last were smaller, and in absolutely fresh condition; the females apparently barren, there being no difference between them and the males in the shape or size of the body, while there was a decided and very apparent difference amongst the first lot. These data would seem to point to the fact that the later specimens were English bred; and they may also go some way towards explaining why *S. convulvuli* fails to become a permanent resident. It would be interesting to

know whether the experience of other collectors would confirm these deductions or otherwise.—JAMES DOUGLAS; Sherborne.

SPHINX CONVULVI AND ACHERONTIA ATROPOS IN LONDON AND SOMERSETSHIRE.—One evening last autumn a living specimen of *Sphinx convulvi* was brought to me to identify. It had been caught in Shore-ditch, flying to the light of a shop-window, and about the same time a specimen was sent me from Wellington, Somerset, which was found there at rest on a wooden post. About the beginning of October a very fine specimen of *Acherontia atropos* was brought to me, which has recently been taken at rest on the ground in a garden at Bow. This was in very fine condition; that is more than could be said of the specimens of *S. convulvi*.—F. MILTON; 7, Chilton Street, Bethnal Green, Nov. 13th, 1901.

XYLINA FURCIFERA (CONFORMIS) IN LANCASHIRE.—Mr. C. H. Forsythe, of Lancaster, recently sent me a very nice photograph of a moth which he was unable to identify, and which I recognized as *X. conformis*. He states that he took two specimens when beating ivy blossom late at night, nearly 12 o'clock, on Oct. 22nd last.—RICHARD SOUTH.

CHARICLEA DELPHINII.—Two examples of this species have been presented to the British Museum by Mr. J. F. Bennett. These examples, which will be added to the British Collection of Lepidoptera at South Kensington, were obtained at Brighton in 1876, by Mr. Bennett's late father. It is not known whether the examples were captured or reared, but although slightly faded in colour they are in very perfect condition. The British history of this species is given by Mr. Barrett, Lep. Brit. Islands, vi. p. 145. The localities there mentioned are chiefly Berks and Middlesex, and the dates early in the last century.

XANTHIA (MELLINIA) OCELLARIS IN NORTH KENT.—I beg to record the capture of *M. ocellaris* in small numbers, at sugar, in a locality in Kent not far from Wilmington. In 1899 I took three; in 1900, three; and a friend who worked with me, a pair. This September I was too busy to go for the species, but I hope to work it up next year. *M. gilvago* and *M. citrigo* usually are freely taken with *M. ocellaris* in my locality. Three of these specimens are now in the cabinet of E. D. Bostock, Esq.—L. W. NEWMAN; Bexley, Kent.

LUPERINA DUMERILI AT DOVER.—I have the pleasure to announce the capture of a fine female of this rare Noctua, on a gas-lamp in this town, during the latter part of September. It would be as well to put on record that I have parted with the specimen, and it is now in the collection of Mr. Eustace R. Bankes. — H. DOUGLAS STOCKWELL; 2, Albert Road, Dover, Dec. 16th, 1901.

OPHIODES LUNARIS IN CHESHIRE. — While sugaring at Delamere Forest, in company with Mr. A. G. Wallington, in June last, I took a large Noctua which neither I nor Mr. Wallington could identify; and it was not till a week or two ago, when some of my entomological friends of this town, Messrs. Womersley and Collins, saw it among my season's captures, that it was recognized as *Ophiodes lunaris*. I may add that this specimen was exhibited at the Entomological Society of London on Dec. 6th, and also at Chester by Mr. Collins on Dec. 9th. — T. WRIGHT; 13, Heath Side, Warrington, Dec. 12th, 1901.

TREATMENT OF PUPÆ DURING THE WINTER.—Some of us have found it difficult to rear imagines from dug pupæ of *Amphidasys betularia*, and a few other species, as they are so apt to dry up. By putting them in a small tin box, say a tobacco-box, with holes punched in it top and bottom, and burying it a few inches deep in the ground out of doors, I have obtained satisfactory results during the last two or three years. I put a few dry leaves on the top of the box to keep the mould from going through the holes into the box.—F. MILTON; 7, Chilton Street, Bethnal Green, London, E.

MACRO-LEPIDOPTERA IN NORTH STAFFORDSHIRE IN 1901.—The past season has been a very productive one in North Staffordshire, a large number of species having been taken that we had not met with before. Our first captures for the year were *Phigalia pilosaria*, *Hybernina progemmaria*, &c., and on March 31st one *Cymatophora flavicornis* was taken, and several more early in April, at rest on birch twigs. Other species noticed during April were *Anisopteryx æscularia*, *Anticlea badiata*, *Larentia multistrigaria*, *Trachea piniperda* (abundantly on sallow bloom, in company with *Taniocampa gothica*), *T. rubricosa*, *T. instabilis*, *T. stabilis*, *T. cruda*, &c.

May:—*Euchloë cardamines*, *Thecla rubi*, *Saturnia carpinii*, *Venilia maculata* (in the Manifold Valley, very common in Dovedale), *Amphidasys betularia* (black var.), *Tephrosia crepuscularia*, *Bupalus piniaria*, *Abraxas ulmata*, *Lomaspilis marginata*, *Emmelesia affinitata* (a few), *Hypsipetes ruberata*, on the moors (the larvæ of this species we have taken not uncommonly some years on sallow), *H. impluviata*, *Scotosia dubitata* (one hibernated specimen). On the 28th two worn females of *Acronycta menyanthidis* were taken on the moors, from one of which we obtained a batch of ova, and were successful in rearing fifty or sixty larvæ on sallow. *Hadena glaucawas* also fairly common.

June:—*Macroglossa stellatarum*, *Procris geryon* (common locally in Dovedale), *Chelonia plantaginis* (on the moors), *Odontopera bidentata*, *Asthena pulchra* (in the Manifold Valley near Dovedale), *Eupisteria heparata*, *Venusia cambricaria*, *Emmelesia alchemillata*, *Eupithecia venosata* (larvæ of this pretty species were taken from *Silene inflata* planted in the garden), *Melanthia ocellata*, *M. albicollata*, *Melanippe tristata* (common, but local), *M. galiata*, *Cidaria corylata*, *Acronycta megacephala*, *Miana fasciuncula*, *Grammesia trilinea* (at light), *Abrostola urtica* and *A. triplasia* (at flowers of rocket, and at light).

July:—*Epinephele ianira*, *Zygæna filipendulæ*, *Nudaria mundana*, *Liparis auriflua* (at light), *Uropteryx sambucata*, *Larentia cæsiata*, *Anaitis plagiata*, *Cidaria pyraliata*, *C. dotata* (freely at light), *Plusia interrogationis* (a single specimen of this insect was taken, at rest, on a wall, on the moors, on July 8th).

August:—*Vanessa urticae* (very common), *V. io* (this insect, which we have not seen for several years, has been fairly common during August), *V. atalanta* (not nearly so abundant as last year), *Gonepteryx rhamni* (a hibernated specimen of this butterfly, which is rare in the county, was seen in Dovedale on June 4th, also early in August, and a specimen was taken in the Manifold Valley on the 21st), *Halía vanaria*, *Oporabia filigrammaria* (a few on the moors at the end of the month), *Melanthia rubiginata*, *Cidaria ribesiarum*, *C. testata*, *C. populata*,

C. fulvata, *Eubolia mensuaria*, *E. bipunctaria*, *Charæas graminis*, *Noctua glareosa* (at flowers of heather), *Xanthia citrigo*, *X. cerago*, *Cirrhædia xerampelina* (this insect, which we had not taken previous to this year, was found in the Manifold Valley, where seven specimens were taken on Aug. 21st, and three more on the 25th; they were all found at the foot of ash-trees and on the surrounding herbage, between three and four o'clock in the afternoon), *Tethea subtusa* (bred from larvæ taken on poplar in June), *Cloantha solidaginis*, and *Gonoptera libatrix*.

Sugaring we did not try until early in September, when it proved exceedingly attractive. *Anchocelis litura* was on the trees in great numbers, together with *Hydrecia nictitans*, *H. micacea* (worn), *Agrotis suffusa*, *A. saucia* (two specimens), *A. segetum*, *Noctua glareosa*, *N. plecta*, *Orthosia macilenta*, *Anchocelis rufina*, *Xanthia cerago*. On Sept. 11th two specimens of *X. gilvago* turned up in fair condition, and on the 18th two more were taken, also *X. ferruginea*, *Polia chi*, *Miselis oxyacantha* (and the dark brown var.), *Agriopsis aprilina*, *Phlogophora meticulosa*, *Hadena proteus*. On Sunday the 29th, having occasion to pass the trees that had been sugared the previous evening, a fine specimen of *Vanessa c-album* was taken, feeding on the sugar; *Cerastis vaccinii* and *Calocampa exoleta* were also taken early in October, and *Pæcilocampa populi* in November.—J. & W. HILL; 7, Westwood Grove, Leek, Staffordshire, Nov. 14th, 1901.

NOLA ALBULALIS AND NONAGRIA SPARGANII IN SOUTH DEVON.—I have this week had sent to me for determination one of two specimens of *Nola albulalis* captured in South Devon during the past season, but I am asked at present not to state the exact locality. It is a fine and well-marked example. I have also seen a *Nonagria sparganii* from the same district. Neither species has, I believe, hitherto been recorded for Devonshire, though I understand the latter has been known to occur in the county for two or three years or more.—GEO. T. PORRITT; Crosland Hall, near Huddersfield, Dec. 20th, 1901.

~~THE~~ CORRECTION.—The hair-grass alluded to (Entom. xxxiv. 325) is probably *Festuca ovina* (small plants of this order are difficult to identify for certain), not *Aira cæspitosa*, as stated.—F. W. F.

ABUNDANCE OF MELITEA AURINIA IN Co. WESTMEATH.—I have been greatly struck by the abundance of the young larvæ of *M. aurinia* here this autumn. I searched for them in several localities where the food-plant is common, and in every case found them in numbers. In one locality, where they were specially numerous, I collected, I am sure, several thousand in less than half an hour, and could have taken plenty more. In one particular spot I counted no less than eleven of the webs which they spin, all within an area of about fifteen square yards; and as each web contained from about fifty up to several hundred larvæ, it will give some idea of their numbers.—B. L. MIDDLETON; Mullingar, Nov. 3rd, 1901.

VANESSIDÆ IN 1901. — I was specially on the look-out for these during last season, with the following results:—*Vanessa atalanta* was plentiful, although not so common as last year, but the specimens were very small, one measuring only $1\frac{3}{4}$ in. *V. urticae* was more

common than usual, and very fine specimens of this favourite insect frequented the gardens, seeming, with *V. atalanta*, to be especially fond of "everlastings." Not a single specimen of *V. io* was observed, but one fine specimen of *V. polychloros* was seen on Aug. 4th. Early I saw an hibernated specimen of *V. cardui*, although I had not seen any during 1900. The spot where I saw it was a favourite walk, and as I saw one on several other occasions, I at last came to the conclusion that it was a solitary specimen, and on July 17th I caught it, and found it to be a male. This was the only example I saw during the season, although I searched the neighbourhood well, and there are plenty of thistles and also plenty of "ling," of which, I believe, this species is fond.—A. MARSHALL; Cranbrook, Kent.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON. — November 6th, 1901. — The Rev. Canon Fowler, M.A., F.L.S., President, in the chair.—Mr. Arthur W. Bacot, 154, Lower Clapton Road, London, N.E.; Mr. Edward Martin Dadd, 3, Colina Villas, Green Lanes, Wood Green, N.; Mr. George Frederick Leigh, Musgrave Road, Durban, Natal; Mr. Rupert S. Lower, Oswaldton, Bartley Crescent, Wayville, South Australia; Mr. John Crampton Wilkinson Kershaw, Macao, China; Mr. Henry Woolner Peal, Indian Museum, Calcutta; Mr. Ethelbert Forbes Skertchly, Hong-Kong; and Mr. Arthur Smith, 5, Cavendish Street, Grimsby, were elected Fellows of the Society.—The Rev. F. D. Morice exhibited two imperfectly developed females of *Osmia leucomelana* found dead in a rubus stem at Woking, with their cases.—Mr. C. P. Pickett exhibited a series of *Colias hyale* taken at Folkestone during August, 1900–1, including one male dwarf, one male with smoky hind wings, one male with the edge of the hind wings showing a double row of serrated curves, three males with very deep yellow colouring and with spots in the centre of the hind wings twice the normal size, one male under side without spots, one male showing a row of black dots running parallel round the fore and hind wings, also one female with the edge of the hind wings showing a double row of serrated curves, one female with extra deep border to the fore wings, and one female with only half the usual border to the fore wings.—Mr. F. B. Jennings exhibited a specimen of *Trachyphlaeus myrmecophilus*, Seidl., taken at Hastings in September last, retaining intact the deciduous "false mandibles," with the aid of which the imago of the species of this and certain other genera of weevils is said to work its way to the surface after emerging from the pupa under ground. These mandibles are usually shed as soon as the imago begins its life above ground, as there is no further use for them. — Mr. W. J. Kaye exhibited a collection of butterflies made by him in Trinidad, with several hitherto undescribed species. He said that the probable total Rhopalocerous fauna was about 250 species, the island—practically, the size of Somersetshire—being thus remarkably rich in butterflies. The number of the species in the families exhibited were: Nymphalidæ, 34; Satyridæ, 13; Papilionidæ, 6; Pieridæ, 31; Erycinidæ, 29; Lycænidæ,

27; Hesperiidæ, 62—nearly all taken within three or four miles of Port of Spain. The series of *Heliconius telchinia* and *Tithorea megara* var. *flavescens* were particularly fine, showing the yellow colouration only found in Trinidad and upon the coast of Venezuela immediately opposite. A long series of *Papilio xuevis* and *P. alyattus*, many of them bred from the same parent, female, show that these two are really identical species. The number of Erycinidæ in Trinidad compared with the poverty of the same family in other West Indian islands alone indicates the different origin of its fauna, and suggests affinity with the mainland of Venezuela, which at the nearest point is but seven miles distant.—Dr. Chapman exhibited specimens of *Parnassius apollo* taken last July in Castile and Aragon (Spain), as well as a number of specimens of both *P. apollo* and *P. delius*, chiefly Swiss and French, taken by himself, Mr. Tutt, Mr. A. H. Jones (at Digne), and Mr. Rowland Brown (at Susa, North Italy), for comparison with the Spanish specimens and to illustrate the extent to which the races of these species approached each other in Western Europe. The Spanish specimens differed from most of the others in their great size, the males reaching $3\frac{1}{2}$ in. in expanse, and the females $3\frac{7}{8}$ in. Both males and females seemed to be exceedingly close to the Asiatic form of *apollo*, called *hesebolus*, in general facies. The males placed between ordinary Swiss *apollo* and *delius* obviously incline much more to the latter than the former in general tone of colour and intensity of markings. The females were very large, and varied to forms with much increased red ocelli. The best character whereby to distinguish *apollo* and *delius* is certainly the black ringed antennæ, which are also usually proportionally shorter. The denser creamier colouring is also very characteristic, yet this would make the Aragon specimen *delius*. The pouch of the female appears to be identical in both species. The male appendages seem to have no ascertained structural difference beyond one in size, those of *apollo* being larger and apparently more solid. In the Spanish *apollo* this is markedly so, the differences, however, less proportionately than may be observed in *Erebia athiops*, of which the appendages of Continental specimens are so much larger than those of British examples.—Mr. G. C. Bignell sent for discussion a specimen of *Sphecophaga vesparum*, Curt., and the cocoon from which it had been bred. Mr. Donisthorpe expressed his opinion that the host was a ground wasp.—Mr. Gilbert J. Arrow communicated a paper upon “The Genus *Hyliota*, with descriptions of new forms, and a list of described species”; and Mr. W. L. Distant, “Contributions to a knowledge of the Rhynchota.”

November 20th.—Mr. G. H. Verrall, Vice-President, in the chair.—Mr. James B. Casserley, 7, Gloucester Road, Finsbury Park, N., and Mr. M. Lawson Thompson, 35, Leven Street, Saltburn-by-the-Sea, were elected Fellows of the Society.—Mr. A. H. Jones exhibited various Lepidoptera from the Cevennes, including a series of *Lycæna dolus* var. *vittata*, *L. damon*, *L. meleager*, *Melanargia iapygia* var. *cleante*, and *M. galatea* ab. *leucomelas*; also a dark form of *Thais cerisyi* bred from a pupa received from Armenia. He also exhibited a specimen of *Vanessa antiopa* taken this year at Eltham, and two specimens of *Cerastes erythrocephala* bred from ova laid by parent moth captured at salallows near Canterbury. — Mr. H. Rowland Brown exhibited a re-

markable var. of *Melitæa didyma*, taken at Château de la Câte, Tarn, in which the black markings of the lower under-side wings were almost entirely absent; and a series of *Lycæna dolus* var. *vittata* from the Cevennes, with *L. admetus* var. *rippertii*, from Digne, showing the remarkable affinity of the two species, which, however, were never found on the same ground or in the same localities while collecting.—Dr. Chapman exhibited butterflies taken by himself and Mr. G. C. Champion in the Sierra Albarracin, Spain, last July. He said: "The district traversed by Mr. Champion and myself was practically the same as that described by Mrs. Nicholl in the 'Transactions' for 1897, and not many new butterflies were added to Mrs. Nicholl's list. *Z. quercus* was taken at Tragacete, but this is in Castile, not in Aragon. *Augiades sylvanus* was taken both at Albarracin and Tragacete. *Adopæu actæon* was met with at Cuenca (Castile), while *Adopæa linea* seemed to be more abundant than *lineola* at all stations. *L. hylas* and its variety *nivescens* occurred on the same ground. The common form of *L. corydon* seemed to be *corydonius*, or near that variety; this was especially abundant at Tragacete, and was met with at all other places. The very large pale form *hispana* was the commonest at Albarracin, where the *corydonius* form was rare, and at Cuenca, and was not seen at Tragacete. Looking at these and other dimorphic forms occurring here, one could not help questioning whether *admetus* might not be a dimorphic form of *damon*. The former was often abundant, the latter always rather scarce. The females, however, have constant differences, and the general tone of colour and arrangement of spots on the under sides seem abundantly sufficient to satisfy one that they are definite species, though very closely allied. *L. dolus*, however, seems to precisely occupy the relation to *damon* that *nivescens* does to *hylas*, and that the vars. *hispana* and *albicans* do to *corydon*. The male appendages of the three—*damon*, *dolus*, and *admetus*—appear to be identical. We observed nothing to account for or explain the use of the colouring of *Satyrus* var. *uhagoni*. It resembles very much the female of *semele*, which is abundant on the same ground. But the habits of flight of the two are very different, and we never in fact mistook one for the other. The brown colour is no doubt the original one in the Satyrids, but in this case is more probably a reversion."—Mr. L. B. Prout exhibited a number of Geometridæ, also taken by Dr. Chapman and Mr. Champion in Spain.—Mr. F. Merrifield exhibited specimens of *Pieris rapæ* and *P. ergane* from Dahmatia, showing that the two species are extremely difficult to separate, even if they are not identical.—Mr. C. P. Pickett exhibited varieties of *Argynnis paphia* and *A. aglaia* from the New Forest.—Mr. C. J. Watkins sent for exhibition micro-photographs of the larva in its case and the perfect insect of an Oxyethira, one of the Hydroptilidæ, a family of Micro-Trichoptera; these had been taken by Mr. Mearns, of Aberdeen. Also a drawing made by himself under the microscope of a larva (in its case) of the same genus.—H. ROWLAND BROWN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—October 24th, 1901. — Mr. A. Harrison, F.L.S., in the chair. — Mr. West (Greenwich) exhibited about ninety species of British Homoptera, mainly taken by himself, and which he generously gave to the Society's collection.—Mr. Barnett, a long series of *Bryophila muralis* (*glandifera*)

of a somewhat dull coloration, from Shorncliffe, and a series of *B. perla*, including one particularly dark form.—Mr. W. J. Kaye, two species of Lepidoptera new to science, discovered by him at Bartica, British Guiana, during a collecting expedition this year, viz. *Papilio* sp.? near *P. latinus*, and a Sphingid *Ambulyx* sp.? near *A. strigilis*. — Mr. H. Moore, specimens of *Sphinx convolvuli* taken at Rotherhithe this autumn, and an example of *S. ligustri* bred from a larva found in the same place.—Messrs. Harrison and Main, six specimens of *S. convolvuli* taken at the electric lights on the Romford Road, E. — Mr. R. Adkin, bred series of *Plusia moneta* from larvæ found in a garden at Bexley, and a bred series of *P. gamma* from eggs laid by a female which flew into his house. He contributed notes on the occurrence, feeding, and habits of the latter species. Mr. Adkin also showed a series of *Boarmia repandata* taken by Mr. McArthur in the Isle of Lewis in 1901. The latter gentleman exhibited the same species, captured in 1887 and 1901 in the same place; also a case set up to show the resting habit of the species on the rocks. He also showed a series of *Melanippe sociata* var. *obscurata* from the same locality.—Mr. Main, an unusually large specimen of the spider *Tegenaria domestica*. — Dr. Chapman, *Acontia urania*, a beautiful North American Noctuid he had bred, and three New Zealand specimens of a species of *Oeketicus*.

November 4th.—Mr. W. J. Lucas, B.A., Vice-President, in the chair. Mr. Lowe, of Putney, was elected a member. — Messrs. Harrison and Main exhibited a long bred series of *Agriopsis aprilina* from the New Forest, and series of *Calocampa exoleta* from Delamere Forest.—Mr. Moore, a trap-door spider's nest from Corfu.—Dr. Chapman, long and varied series of *Parnassius apollo* and *P. delius* from various European localities, with many intermediate forms. — Mr. Percy F. Smith gave a lecture on "Spiders," illustrated with a large number of lantern slides.—HY. J. TURNER, *Hon. Report Sec.*

RECENT LITERATURE.

D. W. COQUILLETT. *A Systematic Arrangement of the Families of the Diptera.* (1901 Proc. U. S. Nat. Mus. xxiii. pp. 653-8.)

THE old Latreilleian primary divisions (1805) are adopted, with names "*Proboscidea*" and "*Eproboscidea*" (Pupipara).* The latter embraces the families Nycteribiidæ and Hippoboscidæ, and is considered to differ so importantly from the other forms in structure, habits, and reproduction, as to justify its separation into a group equivalent to all the other Diptera. The Tipulidæ are placed at the lowest rung of the Proboscidea, on account of their "comparatively large size, elongated form, weak organization, numerous, many-branched veins, and long, many-jointed antennæ." At the head are the Borboridæ, a family of Muscæ Acalypteræ.

The Proboscidea comprehend the Orthorhapha and Cyclorhapha; the former with two subsections, *Nemocera* (Tipuloidea with eight

* The name "*Proboscidea*" as limited by Latreille and Coquillett is much more extensive than that of Schiner and other dipterists.

families, and Bibionoidea with five families), and Brachycera (Tabanoidea with six families, Bombylioidea with three, Asiloidea with five, and Phoroidea with two families). The Cyclorhapha are divided into two superfamilies, Syrphoidea (with four families) and Muscoidea (Calypteratæ with six, and Acalypteræ with nineteen families).

G. W. K.

S. H. SCUDDER. *Pink Grasshoppers*. (1901 Entomological News, xii. pp. 129-131, Plate (coloured) vi.)

MANY of the Grasshoppers with elongate antennæ occur in two colour-forms, either leaf-green or dead-leaf brown, there being no structural differences noticeable. Very rarely (less than a dozen times) they have been found of a delicate violet or pink colour, and these are considered by Mr. Scudder to be "sports." Two examples of *Amblycorypha oblongifolia* from Massachusetts are figured; the female is a delicate coral-red colour, while the male is tinged with orange. The eyes are green in both. The causes of this remarkable colouring are quite unknown, and Mr. Scudder's specimens were healthy and behaved quite normally.

E. D. BALL records under the varietal name of *pæta* a pink form of the green *Macropsis lata*, Uhler (1900 'Psyche,' p. 130).

G. W. K.

AMONG recent papers of general interest may also be mentioned:—

Diptera.—A curious case of gynandromorphism is recorded in *Hilara wheeleri*, Melander, from Wyoming, U.S.A. The species of *Hilara* mostly exhibit striking sexual dimorphism; for example, the first segment of the anterior tarsi is greatly enlarged in the male, but of normal shape in the female, this character varying considerably among the various species. The individual in question has the abdominal styles of the female, but the enlarged legs of the male. It is remarkable that in the same locality and at the same time a specimen of *Dilophus tibialis*, Loew, was taken which possessed an antennary appendage arising from the right anterior coxa. (A. L. MELANDER in 'Psyche,' 1901, pp. 213-5; 2 figs.)

Rhynchota.—D. VON SCHLECHTENDAL: *Trama troglodytes*, Heyden, a singular Aphid (Zeitschr. für Entom. vi. pp. 245-55; 14 figs.).

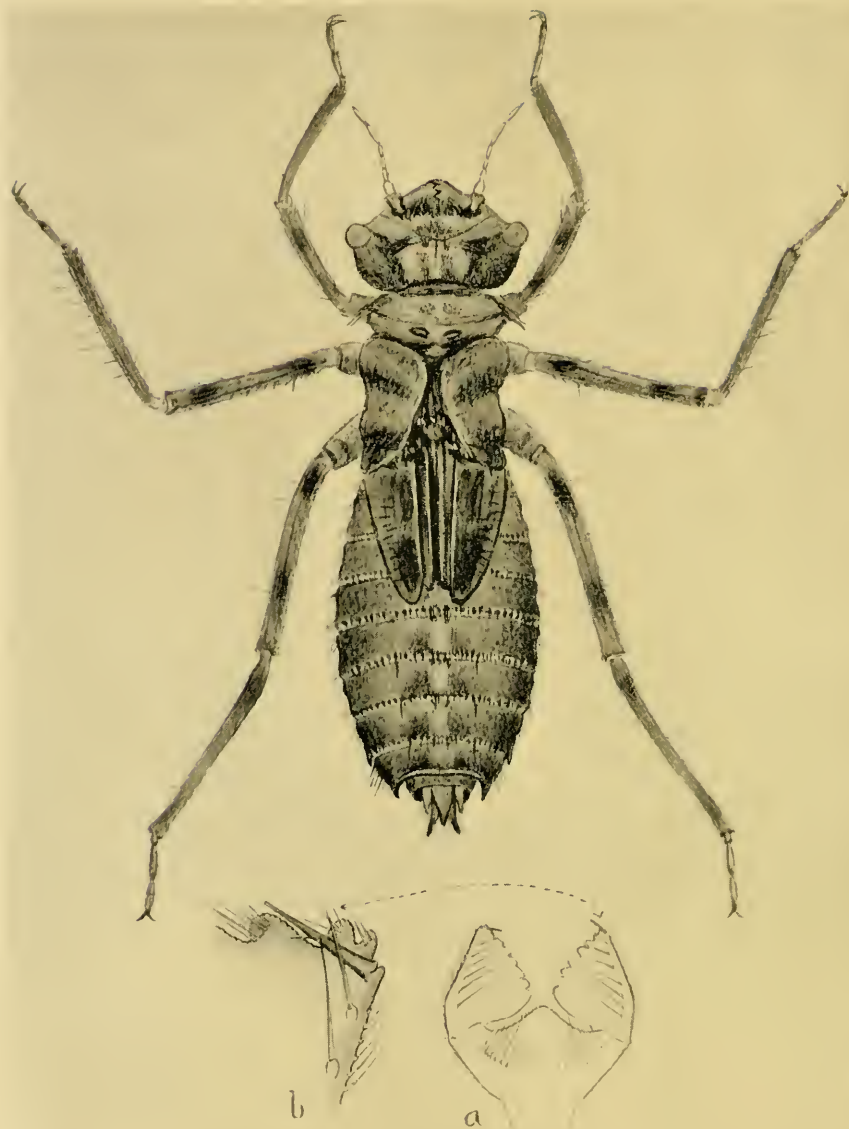
Lepidoptera.—C. SCHRÖDER: Experiments on the Transference of Characters in the Larval State, for ex. in *Tephroclystia vulgata* (t. c., 255-8; 2 figs.).

Neuroptera.—L. KATHARINER: On the Biology of *Perla maxima*, Scop. (t. c. 258-60; fig.).

Lepidoptera.—C. OBRTHÜR: Observations upon the Lepidoptera of the English Fauna (Feuille jeunes naturalistes, pp. 12-17). We propose to consider this at greater length in our next number.

Lepidoptera.—E. MORY: On some New Swiss Hybrids of the Genus *Deilephila* (M. T. Schweiz. Entomol. Gesellsch. x. pp. 333-60; plate).

G. W. K.



W. J. Lucas, del.

Nymph of *Oxygastra curtisii*, Dale ($\times 4$).

a. Labium (mask) flattened out ($\times 4$).

b. Region of moveable joint (much more highly magnified).

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DRAGONFLIES IN 1901.

By W. J. LUCAS, B.A., F.E.S.

THOUGH there is no record of the capture of a new species to be made for the year 1901, yet in some respects the season was an interesting one. The earliest imago noted was a male of *Pyrrhosoma nymphula*—at the Black Pond, in Surrey, on April 28th. By May 12th, three or four species were on the wing at the same place, though even on May 19th such early species as *Calopteryx splendens* and *P. nymphula* were still in the teneral condition at Send, also in Surrey. But during the summer weather at Whitsuntide, which fell at the end of May, dragonflies were numerous, some ten species being noticed on the wing in the New Forest during the week-end.

Sympetrum striolatum was, of course, noticed at several new localities, amongst them being Cumbræ, in Buteshire (A. M. Stewart); Frensham Great Pond, in Surrey (E. B. Bishop and W. J. Ashdown); Pokesdown and Stour side, in Hants; and Totness, in Devon. The species was very plentiful on Esher Common in the autumn, as was also *S. scoticum*. The latter was found at Pokesdown, in Hampshire, and a large number, all practically normal in size and colouring, were received from Rogart and Lairg, in Sutherlandshire (J. M. Munroe).

Libellula depressa was common and mature in the New Forest between May 25th and 28th. It was found in several districts in Yorkshire (G. T. Porritt); and near Bedford (R. W. Thompson). *L. quadrimaculata* was first seen at the Black Pond on May 12th; on June 9th it was in considerable numbers there, and a var. *prænubila* was taken; it was still about on July 8th. It was found at Frensham Great Pond, Surrey (E. B. Bishop); Mr. C. A. Briggs received some specimens from Mr. McArthur, taken at Stornoway, in Lewis; and Mr. A. M. Stewart sent me one taken by Mr. Dunsmore in July in the island of Arran (Scotland). British odonatists

will be pleased to hear that the capture of four more specimens of *L. fulva* may be added to the very short British list—three females and one male—all taken in 1900 and 1901 between Bournemouth and the New Forest. The captures were made by Major Robertson, who works so assiduously the insects of Dorset and Hants. The male had not obtained its blue colouring, one of the females was very immature, and one at least had the black tip to the wings.

Orthetrum cærulescens was seen in the New Forest, sparingly and in teneral condition, between May 27th and 28th; it was very common there as usual in August. *O. cancellatum* was found on July 7th at Frensham Great Pond, in Surrey, by Messrs. E. B. Bishop and W. J. Ashdown.

Perhaps the most important feature of the season was the taking of *Oxygastra curtisii* by Major Robertson in the old locality near Christchurch, in Hampshire. But one capture was made, and in fact, though several visits were made to the locality, only a few specimens in all were seen. On one occasion the net was successfully placed over a female, but she managed to escape. The single specimen taken was given to me, and is a male in perfect condition. The last previous capture of the species was in 1882, when four males were taken. Two visits paid by myself to the locality, on July 31st and on August 7th, failed to reveal its presence, and we must conclude that the insect is over by that date. The spot where *O. curtisii* occurs is not its breeding ground clearly, and the question arises, where is the nymph-stage passed? A drainage-pond near at hand, which apparently disappears in dry weather, cannot be the place, and a little stream, which at times is found connected with the pond, seems equally out of the question. The probability is that the species breeds in the Stour, a clear, swift stream, often deep, running over pebbles and gravel, about a quarter of a mile away. By the kindness of a French naturalist, M. René Martin, of Le Blanc (Indre), I am able to give a description and figure (Pl. 1) of the nymph of *O. curtisii*, made from empty cases which he sent to me, and which were obtained from river-banks in the centre of France. The skins received were not in very good condition, and the species in the nymph-stage being hairy and rugose, the skins were covered with earthy matter which was not easily removed. It is likely, also, that many hairs and bristles were broken off. When living specimens come to hand, it may be found necessary to modify the description a little, especially with regard to the thorax, and possible also the figure may need a little amending where the skin was ruptured by the emergence of the imago. DESCRIPTION: *Length*, from front of face to end of appendages, 21.5 mm.; *greatest width* of abdomen, about 9 mm. *Colour*, a more or less uniform dark brown. *Head*, transversely 6 mm., somewhat less longitudinally; pentangular; surface chiefly rugose, except a few smooth patches, notably three on occiput; a ridge

of hairs between antennæ, a tuft on the vertex, and two tufts containing some very long hairs (or bristles) on occiput; hind margin of occiput concave. *Eyes* small, bluntly conical (nearly spherical) at front lateral corners of head. *Antennæ* 7-jointed; basal two short and swollen; next three rather longer, more slender, and each with a long hair; distal two longer and quite slender, possibly having had a whorl of hairs at one time; length of antennæ about 4 mm. *Mask* (Pl. I. *a*) large, deeply spoon-shaped, covering the face, and reaching back to the insertion of the mid-legs; median lobe obtusely pointed with slopes slightly concave; lateral lobes with outer lateral margin slightly concave, inner lateral margin convex, distal margin finely crenated and divided into eight teeth, each bearing spines, on some teeth as many as six in number (Pl. I. *b*); moveable joint rather short, blunt*; mental setæ, eleven in each comb; lateral setæ, about seven on each side (eight in one case). *Prothorax* narrow, produced laterally into a point on each side bearing a few long stiff bristles. *Pleura* rugose, with a few long stiff bristles. *Wings* rough, with scattered long stiff bristles like those on pleura. *Legs*, fore about 10·5 mm. long, mid about 15 mm., hind about 18 mm.; hairy except, apparently, femora of mid and hind pairs, which, however, are rough; they all bear a number of long, scattered, stiff bristles (many broken off); the femora with a couple of dark bands. *Abdomen* very rugose; stiff hairs along the distal margin of the segments, these being longer in the mid-dorsal line; one or two still longer stiff bristles among the rest on most of the segmental margins; a slightly lighter mid-dorsal line, the colour being a little darker on each side of it; lateral margins hairy, especially in tufts near the front and back of each edge of the segment, on segment nine the marginal hairs much longer; lateral hooks on segments eight and nine, those on nine being much the longer; no dorsal hooks. *Appendages* rough, pointed, hind ones a little longer than dorsal one, laterals rather more than half hind ones.

Gomphus vulgatissimus was found fairly numerous between 25th and 28th May by one of the streams in the New Forest; but specimens were as a rule not very easily taken. They were at that date rather immature, and were generally seen settled upon, or flying round, some of the larger bushes and small trees. Near Oxford, Messrs. A. H. Hamm and W. Holland found the range of this insect to be rather more extended than previously.

Cordulegaster annulatus was common in some parts of the New Forest in August, and on the 3rd of that month a female was watched as she was ovipositing in Blackwater stream by dipping the tip of her abdomen rather forcibly, but apparently

* Possibly the points may have been broken off in specimens mounted for microscopical examination; but all were alike.

quite at random, into the water—in one place amongst loose gravel-stones, where practically no water remained. On August 7th, one was taken near the Stour, at Pokesdown. Mr. G. T. Porritt reports the species from Yorkshire.

Dr. F. A. Walker reports a female *Anax imperator*, taken on Hampstead Heath on May 11th. On June 9th the species was common at the Black Pond as usual. On June 26th, one female at least was watched ovipositing at Byfleet Canal on a large *Potamogeton*, sometimes in the leaf-stalk, at others in the leaf itself, apparently. Messrs. Bishop and Ashdown saw the insect, on July 7th, hovering over Frensham Great Pond.

Brachytrich pratense. In the spring a number of nymphs were procured by Messrs. F. Enock, S. W. Kemp, and myself at the Byfleet Canal, in Surrey, and at the Black Pond; and, later, Mr. Enock bred a fair quantity. When dredged up on a rotting piece of dead bulrush or sedge, their resemblance to it in form and colour is perfect, and the position taken up is well adapted either to enable them to lurk unseen for their unsuspecting prey, or to conceal their presence from some dangerous enemy. The habit they have of remaining perfectly inactive when taken or touched assists also in the same direction. Imagines were common at Byfleet Canal on June 1, and on June 16th I took a female at rest at the Black Pond—still another new record for that prolific locality.

Æschna mixta has again been comparatively common in the South of England, possibly in consequence of an immigration, though personally I think not. The species was again quite numerous at the Black Pond in September. It was noticed singly at several places in the New Forest in August—a female near Rinefield on August 5th, a male at Denney Bog on August 10th (A. B. Higgs), a female at Lady Cross on August 13th, a male near Beaulieu Gate on August 15th. In Epping Forest a female was taken on September 12th (F. W. Champion), and a male on 20th September (H. Champion), both near Chingford. A male (12th August) was sent to me from the golf-links at Deal (R. J. McOnie). *Æ. juncea* did not come across my path once during the season, but Mr. A. M. Stewart reports it from near Paisley, in Renfrewshire, and Mr. C. A. Briggs received the species through Mr. McArthur from Stornoway. Of the common species, *Æ. cyanea* and *Æ. grandis*, it is scarcely necessary to speak, except to say that the latter seemed to be specially common in one or two places. Possibly other collectors may have noticed the same thing. *Æ. cyanea* was taken (A. B. Higgs) in the New Forest, and near Bedford (R. W. Thompson), both new records.

Calopteryx virgo was taken at Tubney Wood, in Berks (W. Holland), on June 2nd. It was a brown male, and if mature, as it appeared to be, was var. *anceps*. On August 5th I noticed one in the New Forest which had a very peculiar appearance as it

flew, and, a capture being made, it was found that part of one of the wings was quite bleached. Major Robertson shewed me a specimen of *C. splendens*, taken at Holmslea, in the New Forest. The species has not, I believe, been previously noted for the Forest. On June 9th, three or four specimens were seen at the Black Pond, one apparently being a female; they no doubt had migrated thither from the river Mole.

Lestes sponsa was reported from Renfrewshire, near Paisley (A. M. Stewart). The presence of *Platynemis pennipes* was noticed near Byfleet station; previously it had only been noticed much nearer Weybridge. On July 24th the same interesting species was found, by no means singly, at the Black Pond (R. South); but one specimen had previously been recorded for that locality. One specimen, at least, was seen in the New Forest, between May 25th and 28th, the previous earliest I had noted being June 6th.

Pyrrosoma nymphula has to be recorded from Renfrewshire, near Paisley (A. M. Stewart), while Mr. C. A. Briggs has received some Stornoway specimens from Mr. McArthur. *P. tenellum* was, as usual, common in August in the New Forest, where a female of var. *rubratum* was taken on August 10th (S. W. Kemp), and two females, intermediate between the type and var. *æneatum*, on July 28th and August 5th.

Ischnura pumilio was beginning to appear on May 27th in the New Forest, and it is possible that it was not uncommon somewhat later, but not one could be seen by the end of July. On May 27th and 28th they were found chiefly on swampy ground, amongst bog-myrtle, and some circumstances seem to point to the fact that they may possibly breed in this swampy ground rather than actually in the streams or pools. All but one of the females I have taken belong more or less pronouncedly to var. *aurantiaca*. *I. elegans* was taken at Stornoway by Mr. McArthur for Mr. Briggs; the specimens, three males and one female, were rather small. Mr. A. M. Stewart took the species near Paisley, in Renfrewshire. Messrs. Bishop and Ashdown captured it on July 7th at Frensham Great Pond, while Mr. South found it not uncommon, on July 24th, in one corner of the Black Pond, single specimens only having been noticed there before. The orange var. *rufescens*, Steph., was taken at Byfleet Canal on June 1st and 26th.

Agrion pulchellum was taken on June 5th, near Oxford (W. Holland), thus adding a new locality to the rather meagre list for this pretty dragonfly. The capture of a male, with the U-shaped spot on the second segment detached from the circle, has already been noted in this magazine (Entom. xxxiv. p. 215). *A. puella* was taken in Renfrewshire, near Paisley, by Mr. Stewart, and a male was taken, presumably in Epping Forest, in which there was a median black line, converting the typical U-shaped spot on the second segment into a trident (H. and F. W. Campion). Both

sexes of *A. mercuriale* were taken in the New Forest between May 25th and 28th, and the species was still on the wing in the beginning of August. Mr. Stewart took *Enallagma cyathigerum* in Renfrewshire, near Paisley, and Messrs. Ashdown and Bishop captured it, on July 7th, at Frensham Great Pond. Mr. McArthur captured for Mr. Briggs twenty-four specimens at Stornoway—twenty males and four females. The specimens were of good size, and in most cases the spot on the second segment was large—in one or two cases similar in shape to that on the specimen figured in the Ent. Mo. Mag. for 1890, p. 110. On June 26th, at Byfleet Canal, I noticed a pair united *per collum*, and settled upon a leaf of *Potamogeton*, in which the female seemed to be ovipositing without going below the surface of the water.

DESCRIPTION OF A NEW SPECIES OF GALL-MAKING CYNIPIDÆ FROM THE N.W. HIMALAYAS.

BY P. CAMERON.

CALLIRHYTIS SEMICARPIFOLIÆ, sp. nov.

Ferrugineous; the antennæ, except the basal two joints, the head, the greater part of the middle lobe of the mesonotum, the scutellum, median segment, the pro- and mesopleuræ, except above and the back of the abdomen, black; the legs lighter coloured than the body, with the tarsi and hinder tibiæ darker; the wings clear hyaline, the nervures blackish, the cubitus paler. ♀. Long. 2·5 mm.

Hab. North-West Himalayas.

Antennæ bare, as long as the body. Head shining, finely aciculated, bare. Except at the base, the middle lobe of the mesonotum is rather strongly transversely striated; the lateral lobes are minutely, obscurely punctured. The parapsidal furrows are complete. Scutellum irregularly punctured, its sides at the base are bordered by shining, smooth furrows; in the middle at the base are two narrow, longish foveæ. The scutellum is roundly convex, and is not much raised above the level of the mesonotum. On the base of the median segment is a smooth, shining semicircular broad keel, which is not quite so broad in the middle as on the sides. The upper edge of the propleuræ and the mesopleuræ at the base above are rufo-testaceous. The median segment bears a thick, white pile. Abdomen smooth and shining; the base and ventral surface are broadly black. The legs have a microscopic white pile. Wings long and narrow, clear hyaline; the transverse cubital nervures and the cubitus are paler than the others. The areolet is completely closed, slightly oblique, and triangular.

The third joint of the antennæ is not much longer than the fourth; the tarsal claws are unidentate; the antennæ are slender and do not become thickened towards the apex; the radial cellule is long and narrow and is not quite closed at the base, the nervure being faint

towards the costa; the median segment is hollowed at the base below the curved keel and, in the centre of this part are three not very distinct, short, stout longitudinal keels.

This species was reared from an acorn collected by Mr. E. P. Stebbing from *Quercus semicarpifolia* in North-West Himalayas. It agrees better with *Callirhytis* than with *Andricus*. One of the European species of *Callirhytis* galls acorns. The Indian oak-galls are quite unknown; and there must be a splendid field for any naturalist who would undertake their investigation. The type of the species here described is in the British Museum.

ON METHODS USED TO PRESERVE COLOUR IN RELAXING ENTOMOLOGICAL SPECIMENS.

BY COLONEL J. G. PILCHER, F.R.C.S.

LIKE most of my fellow-workers in Entomology, my attention was early called to the invariably altered colour of nearly all the blue and green moths submitted to moisture in the relaxing-box; no specimen wholly retained its primitive colour, but became more or less yellowed in the process of relaxing.

The only exception to this rule were the fresh specimens which it has been my custom to put into a moist atmosphere until the *rigor mortis* had passed, when they were entirely freed from all rigidity, and yielded therefore more readily to the touch of the needle than if they had been pinned and allowed to partially dry before they are mounted. In passing I would note the very great help this method has afforded in dealing with all fresh forms, but especially with the small muscular Noctuidæ. In fresh specimens discoloration was not so frequent, though it occasionally did take place in fresh specimens submitted to a moist atmosphere for only a few hours.

The thought occurred to me in 1889 that the cause of discoloration was free ammonia, due to the decomposition which must be presumed to begin in the killing-bottle, and is renewed with greater energy when many dried specimens are put into the relaxing-box at one time. And even before the alkali has tainted the atmosphere of the relaxing-box it would have been conducted to all parts of the specimen by its nervures and their branches.

A volatile acid suggested itself as a fit antagonist to the ammonia, and carbolic acid seemed specially suitable, but its vapour was apparently not diffusive enough, nor did it neutralize the ammonia as produced.

Glacial acetic acid was found to answer best. I placed a small capsule or measure-glass of this acid in the relaxing-box—

60-90 drops as a charge—and renewed it as it evaporated, and this method I have used for many years.

The relaxing-box or vessel which appears to afford advantages above all others is a glass cylinder, covered with a round disk of glass ground to fit accurately. Into this cylinder is placed a tripod of glass, to hold the clock-glass upon which the specimens are to rest. Distilled water to the depth of half an inch is put into the cylinder. The latter is then placed over a Bunsen's burner, with wire gauze over it, and the water allowed to boil for five minutes or more. On allowing the vessel to cool, a partial vacuum is produced, and the cover must be removed with care some hours afterwards, when the specimens to be relaxed and the acetic acid are then inserted.

The vessel cannot remain completely sterilized because of the frequent movement of specimens to and from it, but heat can be applied from time to time, and it can be kept, as free as possible, from those spores which do germinate with marvellous rapidity in the saturated atmosphere of the relaxing-box.

The requisites for this relaxing-chamber can be procured for a few shillings from Messrs. J. J. Griffin & Sons, 20, Sardinia Street, Lincoln's Inn Fields, W.C.

A casual remark by Sir Geo. Hampson on the loss of colour of specimens in the relaxing-box led to an explanation as to the method I adopted, which he has been good enough to test for several months in the Natural History Museum, and with such satisfactory results that he encouraged me to make a note of the method for the benefit of fellow-workers.

These notes are the reply to his request, which it gives me great pleasure to send to him.

5, Stanley Crescent, W.: 16 Jan., 1902.

DESCRIPTIONS OF THREE NEW BUTTERFLIES FROM EAST AFRICA.

BY EMILY MARY SHARPE.

ACRÆA BAXTERI, sp. n.

Closely allied to *A. insignis*, Distant, but is at once distinguished by the clear transparent band on the apical area of the fore wing.

Primaries. Basal half ferruginous red, the outline irregular where it joins the dusky brown terminal portion of the wing; a transverse line of three transparent spots, situated above the third median nervule, and between the first and second radial nervules, thus relieving the apical area of the wing. Costa dusky brown, the extreme base with black streaks, one of the latter extending for a little

way along the inner margin. *Secondaries*. The entire discal area ferruginous, the basal half decidedly black, faintly suffused with ferruginous towards the costal margin; the hind margin narrowly lined with brownish black; the veins on both wings blackish. *Under side*. Primaries similar to those of *A. insignis*, but showing the transparent band, and with the general colour somewhat lighter. Secondaries more sombre in colour than in the allied form; the discal area greyish white, relieved by the black nervules, the hind margin having deep chestnut-brown spots between the nervules; the basal area chestnut-brown, thickly spotted with heavy black dots, a distinct line of these spots outlining the outer edge of the basal half of the wing. Expanse, 2.1 in.

Hab. Mpapwa, German East Africa (*Dr. J. W. Baxter*).

ACRÆA OCHRASCENS, sp. n.

Similar to the species of the *A. serena* group, but distinguished by the pale yellow ground colour of the wings.

Primaries. General colour pale ochre-yellow, the brown spots and markings agreeing with those of *A. serena*, Fabr., but somewhat lighter in colour; the hind marginal border relieved by six small spots of pale ochre, tinged with deeper yellow. *Secondaries*. Ground colour pale ochre-yellow; the brown hind margin with the lighter dots similar to those of the primaries; basal area dusky brown; a faint black streak visible at the end of the cell. *Under side*. Primaries pale yellow, slightly darker in colour on the hind margin; the light nervules heavily streaked with black on the marginal area; the usual black mark at the end of the cell much reduced in size. Secondaries: Ground colour pale yellow, with the usual black and red spots on the basal area; the hind marginal border consisting of spear-shaped marks outlined with black, the usual light nervules having black streaks down the centres; between each of these hastate marks are distinct spots of ferruginous red; this submarginal border broadest near the costa and towards the anal angle; on the extreme edge of the marginal border a row of light yellow spots, but slightly smaller than in *A. serena*. Expanse, 1.1 in.

Hab. Entebbe, Uganda, March to May, 1895 (*F. J. Jackson coll.*).

ELYMNIA RATTRAYI, sp. n.

Similar to *E. phegea*, Fabr., in colour, but easily distinguished by the white band on the secondaries. The female closely resembles *E. bammakoo*, Westw., but the white mark on the primaries is larger, and the white streak on the inner margin is only faintly indicated, while the white band on the secondaries is almost obsolete.

♂. *Primaries*. Ground colour of the primaries brown, crossed near the apical area by a broad transverse band of bright yellow, extending a little below the first median nervule; an ovate spot of yellow near the posterior angle, and almost connected to the conspicuous yellow band by a faint suffusion of yellow. *Secondaries*. A broad

border of brown along the hind margin, this colour again represented on the basal area, with a distinct white band crossing the centre of the wing, and becoming narrower towards the costal margin. *Under side.* Basal area of the primaries brown, with fine wavy lines of white in the discoidal cell; the yellow band distinctly indicated, and extending to the hind margin between the first and second median nervules; the apical area lighter brown, thickly covered with wavy lines of brownish white. Basal area and costal margin of the secondaries deep reddish brown, relieved by five lines of black, somewhat disconnected towards the extreme base; the white band streaked on the inner margin with brown; the broad hind marginal border of brown thickly traversed by innumerable wavy lines of brownish white. Expanse, 3 in.

♀. *Primaries.* General colour brown, relieved by a large white band near the apical area, extending just over the first median nervule; a faint streak of white visible near the centre of the inner margin. *Secondaries.* Ground colour brown, with an almost obsolete band of greyish white crossing the central area of the wing; this colour most strongly pronounced towards the inner margin. *Under side.* Primaries similar to those of the male, with the exception that the white band is replaced by a yellow one; between the first and second median nervules are two tawny yellow spots. Secondaries not different in colour and markings from those of the male above described. Expanse, 3.1 in.

Hab. Entebbe, Uganda, June, 1900 (*Capt. H. B. Ratray*).

NOTES AND OBSERVATIONS.

GORDIUS IN A BUTTERFLY.—In the 'Entomologist,' vol. xxv. (1892), p. 247 and 291, is a notice of a hair-worm emerging from a butterfly. I have met with a precisely similar case. A specimen of *Erebia euryale*, female, taken at Mendel (Tyrol) in 1895, presents, on being taken out of paper, two ends (of one or two worms?) of *Gordius* projecting from the cephalo-thoracic joint; they are brown, coiled, and shrivelled, but, even so, are each between a half and three-quarters of an inch long, and would probably be about one inch and one and a half inch respectively, if straightened out. One often meets with these worms emerging from larvæ, especially in some seasons, but they are decidedly rarer in imagines. These two cases are curiously parallel in both being Satyrids, in the worm emerging at the same point, and in their giving no evidence of their existence at the time the insect was captured. The interest of these specimens is chiefly in their being exceptions to the almost invariable rule, that parasites in the Lepidoptera destroy their hosts before they reach the imaginal stage.—T. A. CHAPMAN; Betula, Reigate, January, 1902.

NOTODONTA DRYINOPE, Lower.—It has already been shown how the large Anthereæ cut out of their hard and tough cocoons (*ante*, p. 10). I now have pleasure in furnishing notes upon the above insect, which also constructs a hard but more breakable cocoon. These cocoons are formed mostly of small fragments of bark and wood, bitten out of the

surface around which the cocoon is constructed. Upon examining a cocoon, a piece will be found to have been removed for the escape of the moth; this piece is not broken out, but is cut or pierced out, the fragment usually falling back into its place when the moth emerges. I have not observed the insect removing this roundish piece, but as I cannot detect any special instrument in the moth, there can be only one explanation as to the manner in which it is cut out, *i. e.* that it is done by the *chrysalis*, for the remarkable spike with which it is provided can be for no other purpose than for piercing the cocoon; this instrument is really double, though it looks like one piece. It is certainly extraordinary how the *chrysalis*, which is shorter than the cocoon, can expand sufficiently to be enabled to bring this spike to work upon the upper end of the cocoon. All the "*Zeuseridæ*" pupæ are provided with stout but blunt "beaks," each species different, with which they break or push out, whole, the strong and thick wad which encloses them in their bores; they then work halfway out of their bores before they split open their shells, and the moths crawl out; but this sharp-spiked pupa is altogether strange in my experiences. I regard it as extremely probable that many other of our *Bombycidæ*, which construct hard cocoons, are provided in the pupal state with special cutting or breaking instruments. Several of the "*Xyloryctidæ*" (*Tineidæ*) are provided with extraordinary head-pieces to enable them to get through the thick "felt"-like constructions with which they securely fasten themselves in their chambers. This by the way. Reverting to our *Notodonta*, it may be noticed that the larva is a queer-looking creature, with its flat and widened out tail-segments; this tail is turned over the larva's back when it rests; it is veined, and so formed as to present a striking resemblance to a young leaf of the tree (*Terminalia*, sp.?) upon which it feeds. The full-grown larva is dull green, head nearly black; very small caterpillars are coffee-brown; they all have the raised, flattened-out "tail," which, however, is lowered during progression.—F. P. DODD; Warburton Street, Townsville, Queensland.

NOTE ON A HABIT OF *CYANIRIS (LYCÆNA) ARGIOLOUS*.—*C. argiolus* was very common in this neighbourhood last year, and I noticed a curious habit of the imago which I have not observed in other butterflies. The insect, while sitting on a leaf or flower, will move the lower wings—not spreading them out as in flight, but vertically up and down, like a lever works. I believe I have seen both male and female moving the lower wings in this manner.—ALFRED SICH; 65, Barrowgate Road, Chiswick, Jan. 6th, 1902.

ACHERONTIA ATROPOS IN WESTMORELAND.—This species has been again present in our district during the year 1901, upwards of a dozen larvæ and pupæ having been found in different parts, and four of these have fallen to my lot. No. 1 pupated Aug. 20th; emerged Oct. 6th. No. 2 pupated Sept. 21st; emerged Nov. 19th. No. 3 pupated Sept. 21st; not yet emerged. No. 4 (pupa) put to force Nov. 23rd; emerged Jan. 10th, 1902. The first three were received as unearthened larvæ, and turned almost immediately. Ten days after pupation they were laid on dry soil, and put to force in an absolutely dry atmosphere of seventy to eighty degrees, not allowed even atmospheric moisture,

which hitherto I have considered a necessity. Nos. 1 and 2 would have emerged, I believe, without forcing, only a little later than the dates given, No. 4 changed to a dark colour on Dec. 20th, and as it lost weight considerably, I believed it to be dying. It proved, however, to be a case of slow development, for on Jan. 10th this year, a fine moth emerged. No. 3 is still healthy, but unchanged in colour. Both these latter would, I suppose, in a natural way, have "gone over" till June this year. The experiment of keeping the pupæ dry during forcing, although as yet not sufficiently extensive to be regarded as conclusive, still leads me to think that with this species a system of forcing, allowing absolute dryness or at most slight atmospheric moisture, offers the best prospect of success. There is no doubt that specimens which naturally would emerge the same year will often do so in spite of excessive moisture, but there is a risk, I think, in applying this treatment to pupæ which would ordinarily "lie over," and in the case of the former, if moisture is not really necessary to their successful emergence, there is little use being at the trouble of providing it.—FRANK LITTLEWOOD; Lynn Garth, Kendal, Westmoreland, Jan. 12th, 1902.

CHÆROCAMPA CELERIO.—In April, ova, and larvæ in various stages of growth, were to be found freely upon a fleshy-leaved and spreading weed. I took a number of the larger larvæ, leaving any under an inch in length, and noticed, particularly in the larger specimens, small marks or scars upon their backs, and feared they were caused by parasites; however, they fed up and attained full growth, some spinning the pupal web, but not a single example changed; all sickened and died, and produced maggots of a rather large grey dipteran. A fresh lot of smaller larvæ was selected, care being taken that all with any discernible marks were rejected; still many proved to be stung, and several healthy pupæ only resulted. As the ova depositing continued during May, and even into June and July, I obtained as many of the moths as I desired, emergence taking place about three weeks after pupation, several having appeared this month. It may be mentioned that June and July are our coldest months; further, that this locality is in a dry belt of country, and that to find a hawk-moth in all its stages at such a time is very unusual, the early emergence being interesting from the fact that the weather is cold, and Lepidoptera can scarcely be met with. The most interesting point concerning *celerio* now in my possession is that fully half of the moths have emerged between *eight a.m.* and *ten a.m.*, the others appearing during the evening, but they are very sluggish, and can safely be left all day or night, even longer. No doubt they would soon become lively if placed in the sun, the shade temperature here seldom being so low as seventy at midday. In Brisbane district *Sphinx casuarinæ* larvæ may be freely found in May and June, but the moths do not appear for several months. Altogether I examined scores, even hundreds, of *celerio* larvæ, but I failed to discover a single specimen of any size without the tell-tale parasitic marks.—F. P. DODD; Warburton Street, Townsville, Queensland.

TWO NOTES ON CYANIRIS ARGOLUS.—On May 10th, 1901, I noticed a female of this species fluttering round a rhododendron in my garden

here, and on closer examination I saw her deposit an egg on one of the unexpanded flower-buds. This rhododendron, of which the flowers are white slightly flushed with pink, is named "purity." During the first week in July I beat some fifty *argiolus* larvæ off holly at Danbury. They were of all sizes. I had never obtained many wild larvæ of this species before, and was surprised to find how many produced ichneumons.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex, Jan. 8th, 1902.

EMERGENCE OF MELANIPPE GALIATA IN DECEMBER.—In the autumn of last year I fed up a couple of batches of *M. galiata*, one of which pupated between Sept. 21st and 25th, and it was a surprise to me, on examining the cage in which they were kept, to find six freshly emerged imagines on the morning of Dec. 8th. The cage in which the larvæ were fed up, and in which the pupæ remained, had throughout the whole time been protected from rain and the direct sunshine, but otherwise fully exposed to the weather. The 8th was a particularly mild day, with a fresh south-west breeze, and warm rain-showers, the shade-temperature reaching 55 degrees, while the minimum of the preceding night had not fallen below 52 degrees.—ROBT. ADKIN; Lewisham, December, 1901.

THE ENTOMOLOGICAL CLUB.—A meeting of this ancient Club was held at the Holborn Restaurant on June 14th last, on the invitation of the host of the evening, Mr. G. H. Verrall. The reception was held in the Entomological Salon, and the guests and members of the Club commenced to arrive soon after 6.30 p.m. By 8 o'clock there was quite a large assemblage of notables in the entomological world. Several only paid a short visit, but nearly seventy sat down to a most *recherché* supper, which was served about 9 o'clock. Mr. Verrall, in proposing the toast of the evening—"The prosperity of the Entomological Club"—very properly embraced the opportunity afforded by the occasion to refer at some length to the ballot that was to take place in another place on the following evening. His remarks on this head were thoroughly impartial in character, but at the same time very much to the purpose. Further reference to the oration cannot be made, however, without infringing the privileges of a guest, or abusing the hospitality of the host.

The pleasure of the evening was again contributed to by Mr. M. Jacoby, who, accompanied by his son on the piano, enchanted the company by his delightful performance on the violin.

CAPTURES AND FIELD REPORTS.

NOTES FROM EAST SUFFOLK, 1901.—The list of insects appended below, and taken here during the last season, may possibly be of interest, a few of the species at any rate being, I believe, somewhat rare or local in this county. The earlier summer months were certainly very productive of insect life; but it has been a peculiar season, and I have been disappointed in the non-occurrence of many autumn insects; ivy, as far as my experience goes, has been very unremunerative.

Insects taken at sugar were as follows :—

Thyatira derasa, *T. batis*, *Cymatophora ocularis*, *Acronycta psi*, *A. leporina* (one), *Leucania conigera*, *L. lithargyria*, *L. comma*, *L. impura*, *L. pallens* (four beautiful dark-red varieties), *Hydræcia nictitans* (some nice varieties), *H. micacea*, *Axylia putris*, *Xylophasia rurea*, *X. lithoxylea*, *X. polyodon*, *X. hepatica*, *Dipterygia pinastri*, *Neuria saponaria* (abundant both at sugar and lilac bloom), *Cerigo cytherea*, *Mamestra abjecta*, *M. anceps* (abundant), *M. brassicae*, *M. persicariae*, *Apamea basilinea*, *A. gemina* (var. *remissa* and many nice forms), *A. fibrosa* (both varieties), *A. ceulea*, *Miama strigilis*, *M. fasciuncula*, *M. furuncula*, *Grammesia trilinea*, *Caradrina morpheus*, *C. blanda*, *C. cubicularis*, *Rusina tenebrosa*, *Agrotis velligera* (one), *A. puta*, *A. suffusa* (June brood), *A. segetum*, *A. exclamationis*, *A. corticea*, *A. nigricans*, *A. tritici*, *A. aquilina*, *Triphæna ianthina*, *T. interjecta* (especially fond of sugared tansy), *T. orbona*, *T. pronuba*, *Noctua augur*, *N. plecta*, *N. c-nigrum*, *N. triangulum*, *N. rhomboidea* (one), *N. brunnea* (one), *N. festiva*, *N. rubi*, *N. umbrosa*, *N. xanthographa*, *Taniocampa gothica*, *T. instabilis*, *T. stabilis*, *T. munda*, *T. cruda*, *Orthosia lota*, *O. macilenta*, *Anchochelis pistacina*, *A. lunosa*, *A. litura*, *Cerastis vaccinii*, *C. spadicea*, *Scopelosoma satellitia*, *Xanthia gilvago*, *X. ferruginea*, *Cosmia trapezina*, *C. affinis*, *Hecatera serena* (one), *Miselia oxyacanthæ*, *Phlogophora meticulosa*, *Euplexia lucipara*, *Aplecta nebulosa*, *A. adrena* (very plentiful), *Hadena protea*, *H. dentina*, *H. chenopodii* (specimens kept appearing from the early part of June to quite the end of August), *H. suasa*, *H. oleracea*, *H. thalassina*, *H. genistæ*, *Xylina rhizolitha*, *Gonoptera libatrix*, *Amphipyra pyramidea*, *A. tragopogonis*, *Mania typica*, *M. maura*, *Catocala nupta*. A small number of *Geometræ* and *Micros* also appeared.

My illuminated moth-trap added a few species, but on the whole I did not find light very attractive, possibly because I did not hit upon the right place to set my trap. *Cerigo cytherea* seems to have a special penchant for light, more so than for sugar, and came in numbers; and, amongst others, I may mention *Nola confusalis*, *Lophopteryx camelina*, *Cilix glaucata*, *Charæas graminis*, *Calamia lutosa*, *Epione apiciaria*, *Selenia lunaria*, *Odontopera bidentata*, *Himera pennaria*, *Acidalia bisetata*, *A. trigeminata* (this insect also comes freely to sugar), *A. rubiginata* (*rubricata*), *A. emarginata*, *A. promutata*, &c. From reed-beds at dusk, in addition to some of the *Leucaniidæ* already noted, *Leucania straminea* (a few), *Calamii phragmitidis* (in some plenty), *Nonagria neurica* (one), together with examples of *Chilo phragmitellus*, were secured. The reed-beds were only worked at dusk, three rather windy nights during the second week in August. *Aspilates citraria* was plentiful in a clover-field, and many other *Geometræ* were met with on the wing at dusk. I took a few *Micros*, but was unable to devote much time to them. *Sphinx convolvuli* appeared on August 15th, and September brought quite an army of them, but for the most part in bad condition, until the first week in October, when there seemed to be a fresh emergence and I took five or six perfect specimens. My experience in this respect seems to tally with that of Mr. J. H. Fowler (*vide Entom. Nov.* 1901, p. 321). Larvæ and pupæ of *Acherontia atropos* have not been uncommon. All the *Noctuæ* mentioned as taken at sugar occurred within a very small area, comprising some two and a half acres of cultivated garden-land and pasture, with a

small copse, mainly composed of oak, ash and elm, adjoining, and situated about a quarter of a mile or less from some salt marshes bordering the river Deben.

I would like to remark upon the attractions of lilac and arbutus. The former was a great bait for *Neuria saponarie* and *Diantheicia cap-sincola*, not to speak of many others. The charms of arbutus, too, seem great. Happening to notice bees and wasps and other insects swarming around its blossoms by day, I suspected it might prove equally attractive to moths at night, and I was not deceived, for though I found only common species, the number of these afforded by a large shrub of arbutus in full bloom compared very favourably with what I saw on the same nights at ivy, the latter being also fully out in the near vicinity. I may add, sugared flowers upon many occasions added to the bag, when tree-trunks and posts were entirely unproductive. (Rev.) A. P. WALLER; Hemley Rectory, Woodbridge, Nov. 21st, 1901.

LEPIDOPTERA AT WITHERSLACK.—Two days, July 7th and 8th, on the well-known Witherslack Mosses proved very successful. A very fine and long series of *Hyria auroraria* (all of the dark purple form) were secured; one or two worn females laid a small batch of ova, and I have succeeded in rearing half a dozen moths; these emerged on January 2nd this year. *Nemeophila russula* was also exceptionally abundant, a grand lot of females being taken; I obtained a quantity of ova of this species also, and was successful in rearing a very complete second brood, not more than three out of about sixty-six refusing to feed up, thirty-three females and twenty-seven males being bred the last week in September. *Canonympha darus* was over, only a few worn ones being seen. *Acidalia fumata* was also over, although a few nice females were secured, after much picking. *Eupithecia nanata* was fairly common and in fine condition; whilst *Lasiocampa (Bombyx) quercus* dashed about at a terrific pace. *Lycena egon* males were in evidence, but no females were observed.—C. F. JOHNSON; Brennington Crescent, Stockport, Jan. 22nd, 1902.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—December 6th, 1901.—The Rev. Canon Fowler, M.A., F.L.S., President, in the chair.—Mr. Frederick E. S. Adair, Flixton Hall, Bungay; Mr. William Anning, Box Hill, Surrey, and 39, Lime Street, London, E.C.; Mr. Edward Connold, 7, Magdalen Terrace, St. Leonards-on-Sea; Mr. Frederick Muir, 86, Christchurch Street, Ipswich; Mr. R. Shelford, The Museum, Sarawak, Borneo; and Mr. John Waddington, 38, Leicester Grove, Blackman Lane, Leeds, were elected Fellows of the Society.—Mr. J. H. Carpenter exhibited a number of *Colias hyale* bred from ova laid by the parent butterfly taken at Sheerness, August 18th, 1900. Mr. J. W. Tutt said that twelve months ago there was no reliable evidence as to the stage in which *hyale* passed the winter, but that Mr. Carpenter had proved that it hibernates in the larval state, and pupates and emerges in the spring. No one has yet successfully bred *C. edusa* through the winter, as they do not and cannot feed up these in this country. *Hyale*, on the other hand, is perfectly quiescent

during the winter months (October 20th to February 3rd, according to Mr. Carpenter's observation), and nothing would induce the larvæ to feed at that period even when subjected to a temperature of between 60° and 70° Fahrenheit. In the South of Europe and in North Africa both species emerge normally in May or earlier, and the larvæ attempt in Great Britain to follow out their natural habit, with the result that the great majority must perish, especially in the case of *C. edusa*. The complete life history has been most accurately described by Mr. F. W. Frohawk in the 'Entomologist' for June, 1901.—Mr. R. S. Standen exhibited specimens of *Lycana dolus*, the type from Bordighera, and also *Pieris brassicæ* with greenish under wings, a common form in the neighbourhood of Florence. Mr. C. P. Pickett exhibited pupa-cases of *Saturnia pavonia*, one with two openings, one with no openings, and a third containing three pupæ, from only one of which the imago had emerged. Mr. J. W. Tutt said that this phenomenon was not unusual in the case of silkworms, and commonly occurred also in the case of artificially bred *Lasiocampa lanestris*, being probably due to overcrowding, but he did not know that there was any evidence how the work was done.—The Rev. A. E. Eaton exhibited adult *Psychodidæ* of morphological interest, preserved in cork tubes with two per cent. formic aldehyde in distilled water.—(1) *Pericoma notabilis*, Etn., as a sample of male flies retaining prothoracic air nipples, such as Curtis figured (Brit. Ent. xvi. 745, 1839), and are possessed by pupæ of both sexes, illustrated both by Mial and Walker and by Fritz Müller in the volume of the 'Transactions' of this Society for 1895; also by Kellogg, Ent. News, xii. 48, figs. A, B. (Feb., 1901). *Pericoma soleata*, Hal. MS., has similar small claviform air-nipples on the prothorax; and so have some undescribed species more nearly related to *P. notabilis*, natives of Middle Europe or of Algeria. (2) Male flies possessing erectile sacs, or else protrusible tentacles arising one on each side of the mesothorax near the spiracle, and receiving a strong branch from the main trachea of each side. In the state of contraction these sacs or tentacles resemble a tuft of hair which is very dense in some flies; by their distension, the tufts are either spread open, or the tuft is resolved into scattered hairs distributed over at least the whole of the upper surface of the tentacle. These organs are probably subservient to sexual attraction, and perhaps secrete scent. A few males possess them in addition to the pair of prothoracic air-nipples—for instance *P. fusca* and the species figured by Curtis, *P. auriculata* (both exhibited); but more species are possessors of the meso-pleural pair of appendages alone. The two species last named differ in the shape of their thoracic appendages now under consideration: the male *P. fusca* has short, chitinous, slightly curved prothoracic air-nipples, and short nipple-like meso-pleural appendages that spread a dense epaulet-like tuft of hair; while *P. auriculata* has slender club-shaped whitish prothoracic air-nipples, and meso-pleural tentacles that are clad with silky hair and are capable of great extension. But in the majority of species furnished with this kind of tracheate appendages issuing from the meso-thorax, those of the prothorax are absent; and some have appendages of the sac form, others of the tentacular form. Among the exhibits, *Ulomyia fuliginosa*, *Pericoma nubila* and *trivialis* are exponents of the short,

nipple-like, erectile, sac-shaped meso-pleural type of appendage seen in *P. fusca*; while *Pericoma palustris*, *mutua* and the nameless species from the Schwarzwald, together with *P. cognata*, which was not exhibited, have the tentacular type of meso-pleural appendage seen in *P. auriculata*. Mr. H. St. J. Donisthorpe read a paper entitled "The Life-history of *Clythra quadripunctata*," and Mr. G. W. Kirkaldy communicated "A Memoir upon the Rhynchotal Family *Capsidæ*."—H. ROWLAND BROWN, M.A., *Hon. Sec.*

Jan. 15th, 69th Annual Meeting.—The Rev. Canon Fowler, M.A., F.L.S., President, in the chair.—After an abstract of the Treasurer's accounts, showing a large balance in the Society's favour, had been read by Colonel Yerbury, R.A., one of the Auditors, Mr. H. Goss, one of the Secretaries, read the Report of the Council. It was then announced that the following had been elected Officers and Council for the Session 1902–1903:—President, the Rev. Canon Fowler, M.A., F.L.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Herbert Goss, F.L.S., and Mr. Henry Rowland-Brown, M.A.; Librarian, Mr. George C. Champion, F.Z.S.; and as other Members of Council, Mr. R. Adkin, Professor T. Hudson Beare, F.R.S.E.; Mr. Arthur J. Chitty, M.A.; Mr. W. L. Distant, Mr. F. DuCane Godman, D.C.L.; F.R.S.; the Rev. Francis D. Morice, M.A.; Professor E. B. Poulton, D.Sc., F.R.S.; Mr. Edward Saunders, F.L.S.; Dr. David Sharp, M.A., F.R.S.; and Colonel C. Swinhoe, M.A., F.L.S. The President announced that he should appoint Dr. F. DuCane Godman, F.R.S., Professor E. B. Poulton, F.R.S.; and Dr. D. Sharp, F.R.S., as Vice-Presidents for the Session 1902–1903. The President referred to the losses the Society had sustained during the past Session by the deaths of Mr. C. E. Collins; the Rev. Professor William P. Dickson, D.D.; Dr. H. W. Livett, M.D.; Mr. Lionel de Nicéville, F.L.S.; Miss Eleanor Ormerod, LL.D.; and Mr. H. Vivian, M.A. He then delivered an Address, in which he dwelt chiefly with the question of protective resemblance and mimicry in the case of the Coleoptera. At the conclusion of the Address a vote of thanks to the President was proposed by Professor Poulton, seconded by Professor Meldola, and carried. A vote of thanks to the other officers was then proposed by Colonel Swinhoe, seconded by Mr. Distant, and carried. Canon Fowler, Mr. Goss, and Mr. Rowland-Brown replied, and the proceedings terminated.—H. Goss and H. ROWLAND-BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*November 28th, 1901.*—Mr. W. J. Lucas, B.A., F.E.S., Vice-President, in the chair. The evening was set apart for a special exhibition of varieties and notable captures. A considerable number of members and friends attended, and a large number of specimens were exhibited.—Mr. Carpenter exhibited a long and fine bred series of *Colias hyale*, from ova laid by a female from Sheerness, taken Aug. 18th, 1900.—Mr. Lucas, male and female of the rare British dragonfly *Libellula fulva*, taken near Bournemouth by Major Robertson; male *Oxygastra curtisii* from the same district; and male, female, and female var. *aurantiaca* of *Ischnura elegans*, from the New Forest. He also showed two large and perfect bubble-shells, *Haminea hydatis*, from South Devon, with a curious thickened and eroded specimen of *Anodonta anatina*, from the

New Forest.—Mr. Ashdown, extreme variations in size of the following Coleoptera:—*Clytus arietis*, *C. mysticus*, *Molochus minor*, and *Pachyta cerambyciformis*.—Mr. West, a species of Homoptera, *Stictocoris flaveolus*, new to the British list, and taken by himself near Blackheath, in August and September, 1901.—Mr. Thornthwaite, a dark *Hybernia defoliaria*, taken by him on his way to the meeting.—Mr. W. J. Kaye, a beautiful series of *Ambulyx rostralis*, a South and Central American Sphingid, with specimens of var. *ganascus*, which some consider a species. Also he showed a single specimen of a new species of *Ambulyx*, which he taken during the past summer, while on an expedition to the interior of British Guiana.—Messrs. Harrison and Main, varied series of (1) *Triphana comes* from various localities, including the Isle of Lewis; (2) *Agrotis tritici* from Isle of Lewis and Wallasey; (3) *Odontopera bidentata*; (4) *Camptogramma bilineata*; and (5) *Melanippe sociata*, all from the Isle of Lewis.—Mr. R. Adkin, several of the same species from the Isle of Lewis, with *Noctua xanthographa*, particularly fine and varied *Boarmia repandata*, *Coremia ferrugata*, and *Xylophasia monoglypha*. He also showed an example of *Pieris daplidice*, with *Colias hyale* and *C. edusa*, taken at Eastbourne, 1901.—Mr. Montgomery, a very fine bred series of *Pieris napi*, including a number of fine examples of var. *bryonia*, from ova laid by a female taken by Mr. Harrison at Meyringen, July 9th, 1900; a series of bred *Leucophasia sinapis*, consisting of four broods from females sent alive to him from Malvern; and bred series of *Argynnis paphia* and var. *valezina* from New Forest ova.—Mr. Porritt, black forms of *Pharetra menyanthidis* from Selby; *Mania typica*, with a large pale pinkish V-shaped mark across each wing; *Cosmia trapezina*, with central band dark olive-green; black *Larentia multistrigaria*; a yellow *Anchocelis rufina*; and a black *Odontopera bidentata*; all from Yorkshire.—Mr. Garrett, *Sphinx convolvuli* from Wilts, September, 1901; *Miselia oxyacanthæ* and var. *capucina* from Wimbledon; *Epnoda luteola* taken off ripe blackberries at Reading; *Dasyampa rubiginea* from Berkshire; and *Tænio-campa populeti* from Wimbledon Common.—Mr. Chittenden, *Lithosia sericea*; var. *confluens* of *Anthrocera trifolii*; black *Nyssia hispidaria*; *Zonosoma pendularia*, blue from Lancashire, light from Kent; *Cymatophora duplaris*, black, bred, from Kent; dark *Pachetra leucophæa*; dark *Hybernia marginaria*, Kent; &c.—Mr. Brown (G. B.), a specimen of *Euvanesa antiopa* taken by his little boy at Lee, together with a *Sphinx convolvuli* taken at Lydd, the former on Aug. 24th, and the latter on Sept. 14th.—Major Ficklin, two very pale *Dianthæcia luteago* var. *ficklini*, and one with suffused marking; together with an example of *Brenthis selene* with very dark under wings. — Mr. Stanley Edwards, several species of the "leaf" butterflies, *Kallima*, and a box of exotic *Papilios*.—Dr. Chapman, *Pieris brassicæ* with black marginal line on hind wing; *Argynnis adippe* var. *chlorodippe* with black suffusion; and a dark variety of *Melitæa athalia* from Spain.—Mr. Rowland-Brown, series of *Lycæna dolus* var. *vittata* from Cannes, and *L. admetus* var. *rippertii* for comparison; a var. of *Melitæa cinæia* with the black spots on the under side almost absent; and *Argynnis lathonia* with the left lower wing abnormally small.—Mr. Sich, small dark var. of *Aglaïs urticæ*; two varieties of *Xylophasia polyodon*, one having a dark median band, the other with confluent

stigmata; a *Plusia gamma* having the γ mark reduced to a pale spot.

December 12th.—Mr. W. J. Lucas, Vice-President, in the chair.—Mr. Newnham, Hersham, Surrey, was elected a member.—Mr. MacArthur exhibited a male specimen of *Lasiocampa quercus* taken at Brighton, and having the female coloration.—Mr. Kirkaldy, a specimen of the Heteropteron *Reduviolus ferus*?, having the wings on one side brachypterous and on the other macropterous.—Mr. F. M. B. Carr, a bred series of *Selenia illunaria*, compared with the female parents, and showing considerable variation; series of *Ennomos angularia* from several localities, for comparison; *Dicycla oo* from Chingford; varied series of *Bryophila muralis* from Hythe; and series of *Acidalia marginipunctata* from Hythe and Porlock, the latter being much the darker.—Dr. Chapman read a paper entitled, "A few weeks in Central Spain, and exhibited long and varied series of the Spanish forms of British Lepidoptera, and of species very closely related to British species.—HY. J. TURNER (*Hon. Report Secy.*).

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The monthly meeting was held on Dec. 9th, 1901, in the Grosvenor Museum, Chester, where the members were most cordially received by the Curator, Mr. Robert Newstead, and Dr. H. Dobie. The Vice-President, Mr. R. Wilding, occupied the chair.—The chairman, on behalf of the Society, thanked Mr. Newstead for his handsome donation to the library of a copy of the first volume of his work on the scale insects entitled, 'A Monograph of the British Coccidæ.' This valuable contribution to the science of entomology has been published by the Ray Society, and contains thirty-nine plates from original drawings by the author. The work, purely a labour of love, is not only of great interest to the entomologist as being the first monograph of these injurious insects ever published in this country, but is also of great practical value to the fruit-grower; and it would be well if a copy of it could be placed in the hands of every market-gardener and horticulturist throughout the land.—The following exhibits were examined:—Recent specimens of *Lycana arion*, and Welsh specimens of *Saturnia pavonia*, by Mr. Newstead; British Aphodina, including *A. villosus* and *Ægialia rufa*, by Mr. Wilding; *Trigonogenius globulus*, a Coleopteron new to the Cheshire list, on behalf of Mr. E. J. Burgess-Sopp; rare Aculeate Hymenoptera from Cheshire and North Wales, including *Pompilus approximatus*, *Astata stigma*, *Oxybelus mucronatus*, *Vespa austriaca*, *Colletes cunicularia*, *Halictus atricornis*, *Osmia xanthomelana* *O. inermis*, and *O. parietina*, by Mr. Willoughby Gardner; the exceedingly rare *Ophiodes lunaris*, taken in Delamere Forest by Mr. T. Wright, of Warrington (an account of this capture, establishing its genuineness beyond all doubt, was given by Mr. Joseph Collins, along with a summary of all the previous British records); a fine series of Lepidoptera from Simonswood Moss, including *Carsia imbutata* and *Celana haworthii*, by Dr. J. Cotton.—Mr. Newstead read a paper entitled "Entomological Gleanings from my Diary," which was illustrated by electric light views. As usual, it was exceedingly instructive, almost every sentence containing some new observation or fact in insect economy, so that this most wide-awake of naturalists kept his hearers

on the alert all the time. The paper included the following subjects :—A night in Delamere with an electric arc lamp; the occurrence of *Zeuzera asculi* in Cheshire; the assembling of *Saturnia paronia*; jays and the larvæ of *Geometra papilionaria*; the genus *Sesia* in Delamere; *Tipula oleracea* and its ravages—how the rooks and gulls destroy it by thousands, four hundred being found in a single pellet or casting of the black-headed gull; the life-history of *Selandria atra*, or pear-tree sawfly; and recent researches amongst the scale insects. Hearty thanks were offered to Mr. Newstead by Mr. R. Wilding, Dr. J. W. Ellis, and Mr. W. Gardner.—FREDERICK BIRCH, *Hon. Secretary*.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—November 18th, 1901.—Mr. A. H. Martineau in the chair. Dr. Stacey Wilson and Mr. E. A. Laxar were elected members of the Society.—Mr. Wainwright exhibited the Tachinid *Brachychæta spinigera* from near Hampton-in-Arden, and said that this was the species which had been described by Meade as *Desroidea fusca*, and not *Staurochæta gracilis*, as supposed by Brauer and Von Bergan Stamm.—Mr. P. W. Wynn, a number of Lepidoptera taken by himself in South Devonshire, during the last week of August and first of September this year; amongst others were *Lithosia caniola*, three worn specimens; *Leucania albipuncta*, one only; *Caradrina exigua*, two only; *C. ambigua*, a nice long series in very fine condition; *Heliothis armigera*, worn; *Aspilates ochrearia* (*citraria*), a nice long series; *Acidalia subsericeata*; and a very fine long series of *A. marginipunctata*.—Mr. A. D. Finns, mounted preparations and drawings of marine larvæ which he believed to belong to the genus *Clunio*, and which were taken submerged in rock-pools at Port Erin Bay, Isle of Man.—Mr. J. T. Fountain, Lepidoptera from Jersey :—a series of *Callimorpha quadripunctaria* (*hera*), including forms running into yellow; a long and very variable series of *Bryophila muralis*, and a very fine series of *Psecadia bipunctella*; the last species, he said, was found early in the morning, and the earlier they were looked for, the more there were, most being found at six a.m.—Mr. R. C. Bradley, a series of *Pelecocera tricincta* from Bournemouth, taken this summer; this time he found them on the top of the cliffs, not in the hollows of the chines as before.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

Photography for Naturalists. By DOUGLAS ENGLISH. Illustrated by the Author's photographs from the living objects. London: Nisffe and Sons, Limited. 1901.

Present-day biologists have a great advantage over their predecessors in that they have a ready means of recording facts in connection with animal life other than by drawing, painting, or verbal description. To the brothers Kearton, perhaps, we owe chiefly the popularizing of the camera in field natural history, and in Mr. English's book we are reminded of the work of the better known writers just mentioned. In addition to general information on

methods, aims, apparatus, and materials, there are chapters specially devoted to various groups of animals, though the information given under these various headings often seems to be of general application. Most of the somewhat numerous illustrations we like very much,



LUCANUS CERVUS. (From 'Photography for Naturalists.')

the small mammals, reptiles, and fish being in most cases particularly pleasing. Entomologists no doubt would have forgiven the author if he had devoted more than one chapter to their *special* branch, but that, of course, was out of the question, and, indeed, unnecessary, since throughout the book are given so many hints on means and methods of securing desired results. Perhaps it is hardly worth mentioning



VANESSA ATALANTA. (From 'Photography for Naturalists.')

that we notice the word "variety" used more than once where "species" is clearly intended; and that we fail to see where the "birds" will fall in the scheme of Nature if they are not to be classed amongst the "animals" (p. 27). Mr. English is clearly writing about what he has himself practised, and we heartily recommend his work to the favourable notice of the "Naturalist with a Camera."

Two illustrations in the book are here reproduced by permission of the publishers.

W. J. LUCAS.

W. F. DE VISMES KANE.—*A Catalogue of the Lepidoptera of Ireland.* Reprinted, with an Introduction, from the 'Entomologist,' 1901. West, Newman & Co. xviii, viii, and 166 pp.; and a coloured Plate.

THE readers of the 'Entomologist' will already be familiar with the main portion of this useful work, which has been running serially for some years through the pages of the 'Entomologist,' and now republished in a complete and handy form, prefaced by a discussion upon the origin of the distribution of the Irish Lepidopterous Fauna.

From the collector's standpoint, Ireland is not offered as an attractive field, for not only does the climate interfere with continuous work, but Lepidoptera in most districts are actually scarce. This is due to, "firstly, the very large area of country with a heavy and tenacious soil, which retains and becomes sodden with wet. Secondly, by the 'insular climate,' with constant rainfall and but little frost throughout the autumn, winter, and spring; . . . while the summers are characterized by the want of sunlight and heat." The absence of the great banks and hedgerows of England—due to ancient and settled agriculture—the absence of any great districts of primæval forest-lands, or of fen districts, &c., are other causes of this scarcity. Where the opposite conditions prevail, are the most productive hunting-grounds, as also the extensive bogs, and the long coast-line with sand-dunes. "In such situations no disappointment will be felt by the most greedy collector."

Ireland is held out, however, as "unrivalled in Europe in respect of isolation of geological history," and it is for the purpose of elucidating the numerous problems connected with the origins of the geographical distribution of the Insecta that scientific collectors are so much needed in Ireland. Even in England, the only orders of whose local distribution there is extended information are Lepidoptera and Coleoptera; while in Ireland, Scotland, and Wales there are huge tracts entomologically unknown. In Scotland a few "show places"—as, for example, Rannoch—are visited year after year for the same rarities, while the lonely glens of Ross and the wild moors of the Hebrides remain silent. In Ireland it is almost incredible that the Lepidoptera are a "neglected order," but now that Mr. Kane has provided a sound Introduction, based upon many years of patient research, it remains for the many enthusiastic and experienced English collectors to combine an inexpensive and health-giving holiday amid magnificent scenery with opportunities for entomological work of an enduring value.

The origin of the Palearctic Insect fauna is an extremely difficult matter to discuss briefly. In the first place, the leading authorities are widely divergent as to their opinions on climatic conditions at certain important periods; and, secondly, even were this not so, it is very doubtful whether the methods of dispersal adopted by the Insecta are at all comparable with those employed by *e.g.* the Mammalia. As the principal arguments of writers are in general based upon their studies of Vertebrates, Plants, and, to some extent, Mollusca, we may, in following these authorities, be founding our speculations on an erroneous basis. Students of the Vertebrata, moreover, are enormously aided by fossil remains, which in the Insecta are so seldom found, and when found are so rarely in sufficiently good preservation for the obtaining of more than very general inferences as to their systematic position, that they may safely be disregarded in detailed work.

It is usually admitted that in the earlier periods of the Tertiary Epoch—the epoch in which we are now actually living, though it was formerly the fashion to isolate ourselves in a “Quaternary Epoch”—the climate and configuration of Western Europe were very different to their present condition. The former was semi-tropical, while the Continent had a notable extension westwards, there being solid land, broadly speaking, from North Scandinavia to Spain, including the British Isles. Till recently it was very generally held that a “Glacial Period” or “Ice Age” ensued, which was of such a rigorous nature that all life was blotted out over almost the whole of Europe. This is the view held, for instance, by Buchanan White,* E. Hofman,† and W. Petersen.‡ R. F. Scharff, on the contrary,§ maintains an almost diametrically opposite view, the crux of his position being “that the glacial period in Europe was not a time of extreme cold, and that its destructive effect on the animals and plants was by no means such as is currently reported”; in fact, that the climate was not very different from what obtains now, but moister, with warmer winters and cooler summers. Scharff has been criticized at great length by L. Stejneger,|| who holds an intermediate position, and considers that the Ice Age in Europe was similar in climate to that now obtaining in Greenland and the islands north of Hudson’s Bay.¶ It is therefore obvious that the presence or absence, at the present day, of “pre-glacial” faunas in the British Islands, and in Ireland especially, is far from being an established fact. Buchanan White considered that Britain derived the whole of “its butterfly fauna from Continental Europe in post-glacial times,” a natural sequence to his belief of the rigour of the glacial climate. It is remarkable, however, that at the commencement of the Ice Age a large portion of the western continent was submerged, and Ireland was cut off from Spain, but was nevertheless prolonged southwards considerably beyond its present limits. It is considered possible that this south-western extension—now submerged—was the refuge of the pre-glacial semi-tropical British “Biota” (as Stejneger terms the “Fauna” and “Flora”). The presence in Ireland of such forms as the spotted slug (*Geomalacus maculosus*), and the strawberry-tree (*Arbutus unedo*), can scarcely be otherwise explained, although Kane seems to favour a post-glacial bridge between South Ireland and the west coast of France. It is doubtful, however, whether any Insects can be pointed out with any degree of certainty as pre-glacial relics, and there is always the risk of confounding these with comparatively recent importations due to the formerly not inconsiderable commerce between the Peninsula and Ireland. Among these “relics” may possibly be the little moth *Zelleria phillyrella*, a native of Southern France, Italy,

* “Some thoughts on the distribution of the British Butterflies,” 1881, ‘Entomologist,’ xiv. pp. 265–77.

† “Die Isoporien der Europ. Tagfalter,” 1873, Inaugural Dissert. Philos. Fakultät, Jena.

‡ “Die Lepidopt. Fauna d. arktisch. Gebiete v. Europa,” 1888, Beitr. Kenntn. Russ. Reichs iv.

§ ‘History of the European Fauna,’ London, 1899, vii and 364 pp., 21 figs.

|| Scharff’s “History of the Europ. Fauna,” 1901, American Nat. xxxv. p. 87, et seqq.

¶ In connection with this Stejneger notes that a humming-bird occurs as far North as Sitka, almost within sight of the gigantic glaciers.

and Greece, and recently discovered in Connemara, but not found elsewhere in Britain. The weevil *Otiorrhynchus auropunctatus* occurs also in Ireland, but not elsewhere north of the Auvergne Mountains.

Stejneger considers that some pre-glacial forms (such as *Geomalacus*) may well have survived the Glacial Period in sheltered nooks, and adds:—"We see even to-day isolated spots having a southern temperature within the limits of countries with a northern climate, and, on the other hand, similar northern oases in regions bounded by isotherms indicating a southern climate."

Stejneger also contends that too much reliance must not be placed on an admixture of northern and southern forms, as to conditions of climate. It is well known that the tiger, usually regarded as a tropical animal, hunts the wild reindeer in Manchuria, in a district having an annual temperature of between 0° and -2° C.

Since the climax of the Glacial Period, whatever may have been the amount of rigour then endured, the cold has gradually diminished, and our islands have been gradually restocked from the Continent. There is little agreement as to periods at which this influx occurred, and these matters cannot possibly be discussed within the limits of this notice. Suffice it to say that the greater part probably took place when the isles (or rather Great Britain only) were joined to the Continent by France and by Scandinavia. although of course there was much topographical shifting during the periods in question. Ireland was cut off at probably a very early date, and it is to this in great part that the meagre Irish fauna is due. Kane, however, insists upon the misleading character of a survey of the extant species, based solely upon geological history, without considering the characteristics of the organisms, and their capabilities of adaptation to environment. He regards the restriction of distribution in many of the Irish Lepidoptera as due to a similar restriction of the food-plant. *Rhodocera* (*Gonepteryx*) *rharni*, e.g., is apparently restricted, in Ireland, to the "localities affording a sufficient abundance of *Rhamnus*, and not by climatic conditions; *Carsia paludata* is similarly dependent upon its local food-plant," *Vaccinium oxycoccos*. *Larentia flavicinctana* has hitherto only been noted—and that recently—from Ballycastle, but its search is recommended on its food-plant, *Saxifraga hypnoides*, along the Antrim, Sligo, and Clare coast-line. The notable absence of many English fen-haunting species from the Irish loughs, where *Arundo*, *Typha*, and various Carices are plentiful, is explained by the supposition that these insects "reached England from Holland, and, not finding suitable conditions west of Cambridge, did not spread further."

One of the most remarkable and inexplicable failures in the Irish fauna is the lepidopteron *Vanessa cardui*, which establishes itself either partially or wholly, with difficulty. As the "Painted Lady" is cosmopolitan, having penetrated to New Zealand, and even to the Hawaiian group, it is not easy to account for this instability by a reference to the "insular" climate of Ireland.

The impression gained from a study of the facts in their widest application leads only to the opinion that it is possible to say very little definite at present—as regards the Insecta, at least—and this is strengthened by close examination of the speculations advanced by White, Scharff, Stejneger, and Kane, in the works cited.

G. W. K.

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VOL. XXXV.]

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FORMATION OF PATTERN ON EGGSHELL OF A SPECIES OF LEPIDOPTERA.

BY AMBROSE QUAIL, F.E.S.

MESSRS. DAWSON and WOODHEAD published* the results of some experiments with certain fats and waxes, showing that on cooling these form into shapes of a "crystalline" nature; melted beeswax forming into natural hexagons, the dimensions of which may be varied by the thickness of the wax, microscopical hexagons resulting when very thin.

Analogy between these naturally formed "crystalline" shapes of fats and waxes, and the sculpturing of the eggshell of lepidopterous ova suggests itself, and to this I refer in my paper on "Embryology," Part I. (Trans. N. Z. Institute, vol. xxxiii.). A recent examination which I made will no doubt be of interest, and so far as it goes justifies the analogy.

The ovum of *Melanchra* (*Mamestra*) *mutans* has very distinct sculpturing, probably not more so than other *Mamestra*, but the longitudinal ribs are strongly developed, the transverse lines being very fine, it is really only with high magnification it is seen that the fundamental pattern is a modified hexagon; at the micropylar area the pattern is definitely hexagonal. Theoretically, it might be suggested that the strong parallel ribs assist the ova to keep in position until deposited, but this does not appear to be so.

Within the abdomen of Hepiali the ova are connected by thread-like tissue, each ovum forming a definite part of long strings of ova, and are not easily separable. The ova of *M. mutans* are not so connected by tissue; in fact, I was unable to detect any such bearing definite relation to the ova, which are smooth, placed end on end, pressed flat against each other, so

* 'Natural Science,' vol. xv. p. 347.

forming continuous *rouleaux* of ova, from which any and each is easily separable. It is not easy to detect the exact process, but I am fully satisfied that the *rouleaux* of ova are bathed lengthwise by a fluid (fat?); so long as this continues the ova are smooth, but as the quantity of fluid diminishes the ova become exposed to the air, sculpturing forms thereon, when quite dry the ova have orthodox sculpture of deposited ova.

There is little doubt that the bathing of the ova with fluid continues until the act of deposition, and it seems certain that the pattern of the ovum is due to this fluid, as it dries on exposure to air, forming into "crystalline" shapes. The fact that a few ova remained smooth is in accord with this conclusion, since these were amongst the earliest exposed to the air on opening the abdomen, being thereby probably too suddenly deprived of the necessary fluid.

Palmerston, N., New Zealand: Dec. 3rd, 1901.

THE COCCID GENUS *AULACASPIS*.

By T. D. A. COCKERELL.

THE genus *Aulacaspis*, the type of which is *A. rosæ* (Bouché), was separated from *Diaspis* by the present writer in 1893. The generic characters were supposed to be the strongly tricarinate male scale, and the divergent median lobes of the female, serrate on their long inner margins. Mr. R. Newstead, in his 'Monograph of the Coccidæ of the British Isles,' just published by the Ray Society, argues that these characters are not of generic importance. Nevertheless, he accepts *Aulacaspis*, distinguishing it from *Diaspis* by the regular rows of dorsal glands in the abdomen of the female. This character, taken as generic, gives us a new classification of the species, and I have therefore attempted to see whether it could be applied satisfactorily to all the species of the world. After some study, I remained undecided whether or not to accept Mr. Newstead's proposed reform, until I observed that by segregating the species on the proposed basis *Diaspis* became an American genus, *Aulacaspis* an Old World one. The type of *Diaspis* is *D. calyptroides*, which lives on cacti, and is unquestionably of American origin. Other species of *Diaspis*, tested by Mr. Newstead's character, are *D. celtidis*, *arizonicus*, *townsendi*, *pharadendri*, *baccharidis*, and *australis*, all American. *D. carueli* was first found in Europe, and has been thought to be of European origin; I now believe it is American, as it is not uncommon in the United States, and it is significant that the British specimens were on an American

species of *Juniperus*. *Aulacaspis boisduvalii* v. *maculata*, Ckll., becomes *Diaspis boisduvalii* v. *maculata*. *Aulacaspis miranda*, Ckll., becomes *Diaspis miranda*. *Aulacaspis cattleyæ*, Ckll., becomes *Diaspis cattleyæ*. These three are all American. *Diaspis piricola*, Del Guercio, appears to be certainly palæarctic, yet it is not an *Aulacaspis*. But it has the club-shaped glands at the bases of the lobes, as in *Diaspidiotus*, and I think it is related thereto rather than to *Diaspis*. It may stand as *Epidiaspis piricola*, using in a generic sense the subgeneric name already applied to it. ('Suppt. Check-list of Coccidæ,' p. 398.) *Aulacaspis* will contain at least the following, all described or listed under *Diaspis* by authors:—

Aulacaspis rosæ (Bouché). Europe.

Aulacaspis fagrææ (Green). Ceylon. The male scale has no keel.

Aulacaspis pentagona (Targ.). Probably native of Japan or China.

Aulacaspis auranticolor (Ckll.). Japan. The first (caudad) row of dorsal glands consists of only eight, the second has hardly so many.

Aulacaspis persimilis (Ckll.). Mexico; but so close to *pentagona* that it is doubtless originally from the same region, and was taken to Mexico on cultivated plants. It is possibly only a variety of *pentagona*.

Aulacaspis loranthi (Green). Ceylon. Male scale tricarinate.

Aulacaspis crawii (Ckll.). China.

Aulacaspis crawii fulleri (Ckll.). South Africa.

Diaspis zamiae and *Poliaspis cycadis* are of unknown origin, having been found hitherto on cultivated plants only, mainly in hothouses. But, judging from their affinities as shown by the glands, it seems likely that the first came from tropical America, and the second from the tropics of the Old World, where it finds a reasonably close ally in *Aulacaspis fagrææ*.

I will add a word about Mr. Newstead's treatment of *Parlatoria*. I have regarded *P. pergandei* as a variety of *proteus*, but I must now agree with Mr. Newstead that it is a valid species. Further, I think *P. proteus* v. *crotonis* (of which Mr. Newstead gives a beautiful plate) is also a good species, to be called *Parlatoria crotonis* (Douglas).

East Las Vegas, New Mexico, U.S.A.:

Jan. 2nd, 1902.

A FEW NOTES ON SOME OF THE BUTTERFLIES OF
SYRIA AND PALESTINE.

BY MARGARET E. FOUNTAINE, F.E.S.

THOUGH I spent four months (from April 5th to August 3rd) in these two countries during the past summer, my success entomologically was anything but unprecedented, possibly the many counter interests of the places I visited may in some degree account for this; but at the same time I cannot describe Syria or Palestine, with the exception of one or two favoured spots, as countries in which butterflies might be said to abound. This is, I think, easily accounted for by the excessive aridity and absolute bareness of most of the mountains, which I can only describe as treeless, shrubless, and flowerless wastes, with large rocks and stones strewn everywhere in profuse abundance, even in the narrow strips of cultivated ground, generally appropriated for the cultivation of wheat or barley; indeed, I have seen the furrows of a cornfield entirely composed of loose stones, no sign of earth being visible, but a scanty crop was struggling on towards a mean and miserable harvest notwithstanding. Yet it is in these cornfields, choked with weeds, that (as Mrs. Nicholl remarked) the butterflies often seek a refuge, and places that in Europe would be passed over as most unlikely to be productive of anything worth netting would be the very spots that in Syria one would make for in desperation as the only alternative to an absolutely barren wilderness.

However, in the month of April I had an excellent fortnight's collecting in the neighbourhood of Ain Zahalta (a village in the Lebanon), though the weather some days was not altogether desirable. The country round Beyrout, too, especially up the Nahr-el-Kelb, or Dog River, was on the whole far from disappointing. In May I visited Damascus; and at the end of that month I found myself at Baalbek, a place of immense archaeological interest, but where I did practically no collecting worth mentioning. From June 4th to June 11th I was at Bsherreh, collecting in the neighbourhood of the Cedars. And on June 26th I started from Damascus to take the overland route to Jerusalem on horseback, arriving on July 6th. The heat was terrific, but I managed to do a certain amount of collecting on the way, much to the annoyance of the mukâri, who finally ended in expressing his disapprobation by smashing my net to pieces, presumably by accident (?), but was greatly dismayed when, on being ordered by my courier to unload the baggage horse, another equally well-appointed net was produced from one of my valises, the which he was told that if, when consigned to his care, it should be either torn, lost, or broken, he should receive

no bakhshish at the end of the journey, needless to add that that net arrived at Jerusalem in a high state of preservation.

I will now proceed to describe consecutively the few species I did come across; though my list lacks several that were taken by Mrs. Nicholl in the same localities, and also often at about the same time of year in 1900, and contains very few that she did not take, though my stay in the country began rather earlier than hers, and extended several weeks later in the season. I shall not mention any of the commoner species one meets with everywhere unless I have any remarks to make upon them.

Thais cerisyi, B.—Abundant almost everywhere in Syria, from the sea-level to an elevation of some 4000 ft.; especially common at Ain Zahalta in April. In May, at Alèy, I found the larvæ feeding on a very large kind of *Aristolochia*, which I sent to a friend in Budapest, but unluckily they all died on the journey. I did not see a second brood of this butterfly.

Doritis apollinus, Hbst.—This insect was practically over when I got to Syria, even in the mountains in the middle of April; for, though in some places in the neighbourhood of Ain Zahalta it flew in great abundance, it was almost impossible to find one specimen that was not torn and rubbed. However, I collected a number of the larvæ, which I found in great quantities, full-grown, and rolled up in the leaves of the same large *Aristolochia*, so that in a few days they all pupated. I took some sixty or seventy of them, and could have gathered hundreds more had I wished to do so. The larva of this butterfly had been first pointed out to me by Prof. Day up the Dog River, near Beyrout, feeding on a different and smaller kind of this plant.*

Pieris mesentina, Cramer.—This butterfly was beginning to come out on the plains south of Nazareth the first week in July; but I only succeeded in catching one specimen. It is the strongest and most rapid flyer of any butterfly I have ever seen. On July 31st, at about 5 p.m., I saw several which I could easily have captured in the grounds of the American College at Beyrout, but unluckily, not having my net with me, I was unable to do so; and the following morning, towards midday, the chances of catching swallows on the wing with a butterfly-net could scarcely be less than was my chance at this hour of the day of netting one of these swift-flying *Pieris*. (Observation.—Should not be sought for till after five o'clock on a sunny afternoon.)

Anthocharis belemia var. *glauce*, Hüb.—An occasional much worn specimen down on the coast in April and the beginning of May.

* The first emergence took place on December 22nd; unluckily it was a cripple. Several have since come out, but as yet only three specimens have expanded properly; the rest were all more or less deformed. One specimen, after having remained for about twenty-four hours in exactly the same condition as when it left its chrysalis, all at once began to expand, till it was almost perfect, except for one of the hind wings. Is it usual for freshly-emerged insects to wait twenty-four hours before they make up their minds to develop?—M. E. F.

A. belia var. *ansonis*, Hüb.—Not common, either on the coast or in the mountains.

A. charltonia var. *penia*, Frey.—My experiences with this butterfly seem exactly to tally with those of Mrs. Nicholl and others. Never common, only occurring singly and at rare intervals; I took four specimens, some of which were rather worn, and saw a few besides, near Ain Zahalta, towards the end of April.

A. damone, Feisth.—Fresh and plentiful near Ain Zahalta in April; the females, too, were fairly common, but much less so than the males. Specimens I have seen from Greece were much larger and finer than the Syrian form.

Leucophasia duponcheli var. *æstiva*, Stgr.—I took this variety on the Jebel-el-Arz (Cedar Mountain) early in June, not far below the summit of the pass (8000 ft.) upon which only a week previous I had ridden for a distance of several yards over some still unmelted snow. It was not rare, but difficult to catch, on account of the steepness of the mountain side over which it was flying.

Idmais fausta, Oliv.—Of the habits and life-history of this butterfly I received a very interesting description from Mrs. Day. It first appears on the wing at the very end of June or beginning of July, and from that time produces a succession of broods on till the end of September, when it entirely vanishes in all its stages, and Mrs. Day has hitherto been unable to determine whether it passes the winter, spring and early summer in the ova, larva, or pupa state, or even, possibly, as a hibernating butterfly; though I cannot but think, if this were the case, the warm, sunny days of April, May and June could not fail to tempt it from its winter retreat; and it never reappears till the period above stated when, curiously enough, eggs, caterpillars and butterflies are all to be found simultaneously. The first appearance of it during the past summer, observed by Mrs. Day, was the sight of a worn female laying eggs; this would lead one to lean towards the idea of hibernation in the perfect state. However, at about the same time I saw it myself, inland; first on June 28th, one specimen, fresh out, near Bânyâs, and others, for the most part also quite fresh, three days later, in an olive-garden near the supposed Cana of Galilee, evidently just emerged. I observed it more than once flying in the streets of Jerusalem, and when I returned to Beyrout on July 15th, "the salmon butterfly" was very much in evidence everywhere, I think I might say, in town and country. I also found eggs and larvæ in all stages, feeding in quantities upon the leaves of the caper-plant, which grows wild in these countries. Mrs. Day informed me that, whereas the eggs and caterpillars are always to be found like this from the very beginning of July, she has never been able to discover any during the earlier months of the year. I bred some forty or fifty specimens myself and, with the exception of one deformity, every pupa I had produced a perfect insect, the proportion of males and females being about equal, though the male flies in considerably greater abundance in the natural state. The period from ova to imago occupies only three weeks, or even less; the larvæ feed up with the greatest rapidity; and the pupa stage of these summer broods extends over a period of only a few days. Yet it is as a pupa that I should be most inclined to think it passes those mysterious inter-

mediate months, a problem, Mrs. Day tells me, she is determined to solve, and the solution of which will, I think, be most interesting.

Thecla ilicis var. *caudatula*, Z.—Taken near Ainêta, in the Lebanon, first week in June, on the slopes of a mountain more or less clothed with plantations of young Syrian oak-trees, where they were extremely plentiful, and all, as far as I could make out, belonging to the long-tailed aberration.

T. myrtale, Klug.—Fairly common in the neighbourhood of the Cedars early in June, but I only took one female, and not a very long series of males.

Thestor callimachus, Ev.—I took one perfect male specimen of this butterfly on May 13th, at Alêy. It was probably only just emerging, and a spell of dull cold weather would account for my seeing no more of it before I left Alêy, two days later.

Polyommatus thersamon var. *omphale*, Klug.—This is undoubtedly a summer variety; those I took in the spring were all normal, while all the males of the summer brood possessed tails quite as long, if not longer, than the ordinary female.

Cigaritis acamas, Klug.—Three bad specimens only, all near Beyrout in May, two of which were taken in the grounds of the American College; and I saw another in this same place early in August. Mrs. Day has not as yet been able to discover upon what plant this little *Cigaritis* lays its eggs.

(To be continued.)

NOTES ON THE DIVISION VELIARIA [RHYNCHOTA] (=SUBFAM. VELIDÆ, LETH. & SEV.).

By G. W. KIRKALDY, F.E.S.

(Concluded from Entom. xxxiv. p. 310.)

R. NIGRICANS (*Burm.*).

Velia nigricans, Burm. 1835, Handb. p. 213.

Burmeister's description is altogether inadequate, and the species has long been unknown to me. I now have a pair from Syria which are probably referable to it.

Elongate; first segment of antennæ two-thirds longer than second, second and fourth subequal, third one-sixth longer than fourth; third segment of intermediate tarsi very slightly longer than second. (Macropterous form: pronotum obtusely angulate, obsoletely carinate longitudinally.)

Blackish brown with yellowish pubescence; base of first segment of antennæ pallid. Femora shining black, base (coxæ, spines, except tips of latter, &c.) pallid; an interrupted pale line at apex of pronotum.

♂. Seventh segment above truncate apically, longer than sixth, and a trifle longer than the eighth.

Long. 4 mill.; lat. $1\frac{1}{8}$ mill.

Hab. SYRIA, Kaifa (coll. Kirkaldy).

R. ANGUSTIPES, Uhler. Venezuela, Puerto Cabello (Mus. Hamburg!).

R. RAVANA, sp. nov.

Allied to *crassipes*, but the latter has the ultimate segment of the intermediate tarsi *slightly longer* than the second, the venter carinate, and the colouring different. *R. crassipes* is also larger.

Elongate. Antennæ: first segment one-half longer than the second, which is one-seventh longer than the third, which is one-fifth longer than the fourth; first scarcely longer than third and fourth together. Pronotum (*macropterous*) obtusely rounded; (*apterous*) widely rounded behind. Elytra rounded at apex, not reaching as far as the apex of the genital segments. Anterior tibiæ not dilated, ♂ ♀. Intermediate femora not constricted medianly; ultimate segment of tarsi two and two-thirds as long as penultimate. Posterior femora incrassate; tibiæ sinuous, without a hook at apex; ultimate segment of tarsi three and a half times as long as penultimate. Abdomen moderately long.

Brownish black; head (more or less), and a central longitudinal stripe on pronotum, ferruginous. Antennæ unicolorous (not widely pallid at base of first segment of antennæ). A large silvery patch near antero-lateral angle of pronotum. An elongate spot of base of corium, another in the central cell, and another nearer the apex of the elytra, silvery white; nervures very distinct. Femora more or less pallid, especially basally and beneath; coxæ and trochanters pallid. Connexivum with a broad median longitudinal pale flavous stripe. Venter dark brownish (very thickly dark yellowish pilose) more or less pallid medianly.

♂. Posterior femora two and two-third times as long as wide, three moderate-sized and several small spines beneath; tibiæ strongly sinuous, tuberculo-spinose beneath; seventh abdominal segment beneath, long laterally emarginate, medianly subtruncate, apically depressed; above, truncate apically.

♀. Posterior femora three and a half times as long as wide; spinose similarly to ♂; tibiæ slightly sinuous; seventh segment beneath slightly roundly emarginate.

Long. 4-4.6 mill.; lat. 1.9 mill.

Hab. CEYLON, Peradeniya (E. E. Green).

A LIST OF LEPIDOPTERA COLLECTED BY DR. CUTHBERT CHRISTY IN NIGERIA.

BY EMILY MARY SHARPE.

THE insects in this collection were all taken on the banks of the Niger, or within a few miles of the river, at various points between Lokoja and Ilo. Those from Lokoja were mostly captured on Mount Patti, which rises abruptly behind the town for about a thousand feet. It is thickly wooded, except on the top, which is flat, open, grass country. At a certain spot, used by the Imperial forces stationed at Lokoja as a flag-station and sanatorium for convalescent officers and men, are the remains of what may have been a small village, and round about this spot flourishes a profusion of flowers and plants, many of which seem to be peculiar to the locality. Here more butterflies were to be seen in an hour than could be seen in a month at any other place in Nigeria that I visited.

Lokoja is at the junction of the Benue River with the Niger, and is, roughly speaking, about 400 miles from the sea. Egga is about eighty miles above Lokoja, and Jebba, the head-quarters of the Imperial forces in Nigeria, is some 150 miles further up. Most of the insects from Jebba were collected about the island on which the town and Imperial camp are situated, or on Juju-rock Island. The Juju-rock, such a prominent feature in the landscape at Jebba, rises from the bed of the river to a height of 300 ft. or more. It is practically a sheer cliff on all sides, and was never explored till I succeeded, after three days' toil, in finding a way to the summit in May, 1898. It was up to that date the centre of much superstition and mystery, and was talked of with dread by the natives for hundreds of miles both up and down the river. Its summit is covered with scrub, amongst which I noted several plants I had not seen elsewhere. The same was the case with the butterflies, and two or three species which are specially mentioned in the following list I saw nowhere else. The flora and fauna of the Juju-rock at Jebba are peculiar in many ways, and would, I am sure, well repay anyone making them a special study.

Bajibo, Leaba, Bussa, Yelwa, and Gomba are places on or near the river bank between Jebba and Ilo, the most northerly station in British territory, and nearly a thousand miles from the river's mouth. At Ilo the country is very different to what it is lower down the river. It is less wooded, and large stretches of open country little more than desert are frequent. The people, too, are very different, being a much finer race, particularly the men, who wear the flowing robes and ornaments of the Arab. In this district, bordering upon the Western Soudan, the butterflies

are largely represented by the Pieridæ, especially by the genus *Teracolus*.

The Benue flows for most of its course through impenetrable jungle. The town, and Niger Company's station, of Mozum is about twenty miles from its junction with the Niger.—[C. C.]

Family DANAIDIDÆ.

1. *DANAIS ALCIPPUS* (*Cram.*).—*a*, ♀. Sierra Leone; February, 1898. *b-h*, ♂ ♀. Jebba, River Niger; September, October, 1898. *i, j*, ♂ ♀. Mount Patti, Lokoja; May, 1898. *k-p*, ♂ ♀. Ilo. *q, r*, ♂ ♀. Shonga; September, 1898.

"One of the commonest butterflies all the year round, frequenting the damp open parts near the river."—C. C.

2. *DANAIS PETIVERANA*, *Doubl. & Hewits.*—*a*, ♂. Jebba, Niger River; October, 1898.

"Only observed on one occasion, when a dozen or more appeared in October at one particular spot near the river. They were difficult to catch, owing to their quick movements and rapid flight."—C. C.

Family SATYRIDÆ.

3. *MELANITIS SOLANDRA* (*Fabr.*).—*a*, ♀. Jebba, Niger River; May, 1898.

4. *MYCALESIS MILYAS*, *Hewits.*—*a*, ♂. Jebba, Niger River; September, 1898.

5. *MYCALESIS DESOLATA*, *Butl.*—*a, b*, ♂. Jebba, Niger River; November, 1898.

In the collection at the British Museum three specimens of this species are recorded from the Atbara River and Abyssinia.

6. *MYCALESIS SAFITZA*, *Hewits.*—*a*, ♂. Jebba, Niger River; November, 1898. *b*, ♂. Mozum, Benue River; June, 1899.

7. *MYCALESIS VULGARIS*, *Butl.*—*a-c*, ♂. Jebba, Niger River; May, September, 1898.

8. *YPTHIMA SIMPLICIA*, *Butl.*—*a*. Leaba; December, 1899.

This species seems to be widely distributed, specimens being recorded in the National Collection from Somaliland, Victoria Nyanza, Zomba, Fwambo, and Wadelai.

9. *YPTHIMA DOLETA*, *Kirby.*—*a*, ♂. Jebba, Niger River; September, 1898. *b*, ♀. Lokoja; May, 1898.

10. *YPTHIMA ITONIA*, *Hewits.*—*a*. Shonga; August. *b*. Jebba, Niger River; October, 1898.

Family ACRÆIDÆ.

11. *ACRÆA ZETES* (*Linn.*).—*a*, ♂. Lokoja; May.

12. *ACRÆA CÆCILIA* (*Fabr.*).—*a-d*, ♂ ♀. Jebba, Niger River; September, October, 1898. *e-g*, ♂ ♀. Ilo; March, 1899. *h*, ♀. Shonga; September.

13. *ACRÆA PSEUDEGINA*, *Westw.*—*a-d*, ♂. Lokoja; May. *e*, ♂. Mount Patti, Lokoja; May, 1899. *f, g*, ♂ ♀. Jebba; May, 1898. *h-j*, ♂. Ilo. *k*, ♂. Sierra Leone; February, 1898.

14. *ACRÆA SERENA* (*Fabr.*).—*a*. Leaba; December, 1899. *b, c*. Shonga; August. *d-g*. Jebba, Niger River; September, 1898.

15. *ACRÆA VINIDIA*, *Hewits.*—*a-i*. Jebba, Niger River; May, September, 1898. *j*. Mozum, Benue River; June, 1899.

16. *ACRÆA BONASIA* (*Fabr.*).—*a*. Shonga; August.

17. *ACRÆA LYCIA* (*Fabr.*).—*a, b*. Boussa; December, 1898. *c-j*. Shonga; August, September.

"*Acræa lycia*, *A. pseudegina*, and *A. cæcilia* were exceedingly common along the banks of the River Niger."—C. C.

18. *PLANEMA GEA* (*Fabr.*).—*a, b*, ♂. Sierra Leone; February, 1898.

19. *PLANEMA UMBRA* (*Drury*).—*a*, ♀. Mozum, Benue River; June, 1899.

"Caught in an open glade in the thick jungle on the right bank of the Benue River."—C. C.

Family NYMPHALIDÆ.

20. *ATELLA PHALANTHA* (*Drury*).—*a*. Shonga; August. *b-e*. Ilo; March, 1899. *f*. Jebba; May. *g, h*. Lokoja.

21. *PYRAMEIS CARDUI* (*Linn.*).—*a-e*. Jebba; October.

22. *JUNONIA BOÖPIS*, *Trimen.*—*a*, ♂. Leaba; December, 1899. *b*, ♂. Jebba; November. *c, d*, ♂ ♀. Ilo; January, 1899.

23. *JUNONIA CLELIA* (*Cram.*).—*a*, ♀. Shonga; August. *b, c*, ♂ ♀. Ilo; March, 1899.

24. *JUNONIA CEBRENE*, *Trimen.*—*a*, ♂. Jebba; May. *b-d*, ♂ ♀. Ilo; January, March, 1899. *e*, ♀. Boussa; December.

"*Junonia boöpis*, *J. clelia*, and *J. cebrene* frequent the most exposed stony and glaring hot places. They are difficult insects to catch."—C. C.

25. *PRECIS AMESTRIS* (*Drury*).—*a*. Ilo; March, 1899.

26. *PRECIS TRIMENI* (*Butl.*).—*a*. Shonga; September.

27. *PRECIS CUAMA* (*Hewits.*).—*a, b*. Jebba; October, November.

The species seems to be widely distributed, specimens in the British Museum being recorded from Masailand, Nyasaland, and Mashona.

28. *PRECIS CERYNE* (*Boisd.*).—*a, b*. Shonga; August.

29. *PRECIS LEODORA* (*Godt.*).—*a*. Jebba; September.

30. *PRECIS PELARGA* (*Fabr.*).—*a*. Shonga; August.

31. *PRECIS TEREA* (*Drury*).—*a, b*. Sierra Leone; February, 1898. *c*. Lokoja, 11,000 ft. above river; May. *d, e*. Jebba; May. *f, g*. Ilo; March, 1899.

32. *PRECIS ORTHOSIA* (Klug). — *a*. Lokoja. *b*. Boussa; December. *c*. Jebba; May. *d-g*. Ilo; March, 1899.

"Common in the thicker parts of the jungle."—C. C.

33. *HYPOLIMNAS MISIPPUS* (Linn.). — *a-d*, ♂ ♀. Ilo; March, 1899. *e*, ♂. Boussa; January, 1898.

34. *NEPTIDOPSIS OPHIONE* (Cram.).—*a*. Mozum, Benue River; June, 1899.

35. *BYBLIA GÖTZIUS* (Herbst.).—*a-g*, ♂ ♀. Ilo; March, 1899. *h*, ♂. Jebba; October.

36. *NEPTIS AGATHA* (Stoll.). — *a*, ♀. Shonga; September. *b*, ♂. Jebba; September, 1898. *c*, ♂. Rabba; November. *d*, ♂. Boussa; December.

37. *NEPTIS MELICERTA* (Drury).—*a*. Ilo; March, 1899.

38. *CATUNA CRITHEA* (Drury). — *a*. Mozum, Benue River; June, 1899.

39. *HAMANUMIDA DÆDALUS* (Fabr.).—*a, b*. Ilo: January, 1899. *c*. Ilo; February, 1899. *d-f*. Jebba; November. *g*. Boussa; December. *h, i*. Shonga; August. *j, k*, ♂ ♀. Mount Patti, Lokoja; June.

"Common on shady paths, settling with the wings open, thus escaping observation unless it rises, when it is difficult to catch, owing to its strong flight."—C. C.

40. *EUPHEDRA THEMIS* (Hubn.).—*a*. Ilo; March, 1899.

41. *EUPHEDRA JANETTA* (Butl.).—*a*. Jebba; May.

42. *EUPHEDRA CROSSEI*, sp. n.—♂. Primaries differing from the typical *E. crockeri*, Butler, in having a large ochre-yellow patch on the apical area, as well as a yellowish bronze shading along the inner margin. Secondaries: Central area rather more uniform steel-blue, the other spots and markings not differing from those indicated in other varieties of *E. crockeri*. Under side similar to that of *E. crockeri*. Expanse, 2·4 in.

Hab. Mozum, Benue River; June, 1899. Type.

This species, which belongs to the *E. crockeri* group, has apparently not been named. Two specimens are in the British Museum, one from the Cameroons, and the other from the Lower Niger (Asaba?), collected by Dr. E. W. Crosse. In this genus some of the species have a yellow phase, but whether this can be attributed to a seasonal change of colour remains to be determined.

43. *CHARAXES ACHÆMENES*, Feld.—*a*, ♀. Lokoja; May.

44. *CHARAXES VIOLA*, Butl.—*a*, ♀. Lokoja; May.

45. *CHARAXES VARANES* (Cram.).—*a*. Ilo; March, 1899.

(To be continued.)

VARIATION IN THE GENUS *EREBIA*.

BY GEOFFREY SMITH.

(Continued from p. 9.)

SUFFICIENT stress has not been laid upon the fact that when the mean (M) of a normal scheme of distribution of certain variations is preserved from generation to generation, the measures of those variations will tend to converge toward that mean. It was on this ground that the acquisition of constancy by some character was stated to occur, when both sexes were variable, and all prepotent tendencies to reversion were theoretically eliminated.

One of the properties of M of a normal scheme was stated to be that the most probable value of any unknown measure in a group is M . This results from the following consideration, in the words of Prof. Galton, "that if N be one of the measures, and U be the value of the unit in which the measure is recorded, then the number of measures that fall between $(N - \frac{1}{2} U)$ and $(N + \frac{1}{2} U)$ is greatest when $N = M$." Or from a somewhat different point of view, the idea of mediocre may be extended away from the mean so as to include more measures; but the idea of extreme cannot be so extended, since by the nature of things it is strictly limited. It must also be remembered that as a matter of fact in a normal scheme the mediocre is always the commonest condition, and that the numbers of individuals possessing the various degrees of the character on each side of the mean (M) graduate away, and become less as the extremes are approached. Hence it is that in schemes of distribution applied to the same group from generation to generation a centripetal tendency would hold good, with the final theoretical result that the mean would be established as a constant measure of the character under consideration. Moreover, this tendency to converge toward the mean is increased in the process of sexual reproduction; for, if we take an extreme male, the chance is small of its pairing with a female which is extreme in the same direction, as against the combined chances of its pairing with a female either of the opposite extreme or of the mediocre. In this way, too, the extremes would tend to merge into the mediocre. Of course, all these considerations only hold absolutely, supposing that the scheme is normal, that the selection of mates is made entirely by chance, and also *ex hypothesi* that the numbers of the sexes are proportional.

We will now go on to consider the numerical proportions of the sexes with reference to the genus *Erebia*.

In chap. viii. part ii. of the 'Descent of Man' (2nd edition), Darwin has written on this subject: the point of view taken is that normally equal numbers of the sexes should be produced,

but that various circumstances tend to upset this equal proportion. Among men, mammals in general, birds, fish, &c., various conditions occur from equality to great preponderance of one sex or the other, and equally various circumstances seem to determine these conditions. Among Lepidoptera various conditions in the numerical proportions also occur; in silk-moths the females are said to be bred in excess; in Rhopalocera the general impression of collectors is that males are produced in excess. We are not here concerned with the actual production of males or females, but of their arrival to the state of sexual maturity; so that what we have to examine is this impression of collectors. Two views may be taken—(1) that owing to differences in habits, times of appearance, &c., of the two sexes, this impression of collectors is a mistaken one; (2) that this impression is a true one. The former view was taken by Mr. Stainton, the latter by Mr. Bates, in the discussion before the Entomological Society in 1868. It seems probable that there is truth in both views, so long as each is not applied to Rhopalocera in general. No doubt if the two sexes of a species have different habits, &c., collectors who are ignorant of those habits would very likely gain a wrong impression of the numerical proportion of the sexes; but if such a disparity in the habits does not exist, it is an unwarrantable position to ignore the repeated assertions of collectors. Now, with the genus *Erebia* I do not think there is any great difference in the habits of the sexes. Whenever I have taken a female of the species that I have collected (and I have taken many), I have done so generally unwittingly until the capture has been made, and usually I have caught females flying on the same ground with males, from which they are indistinguishable in general appearance, flight, &c., and conspicuousness. Then again, even supposing that the females do lie hid more than the males, or occur at different periods, it would be rash to suppose that a collector of even moderate attainments does not state or even understate the numerical disproportion of the sexes by the collections he brings home; for, knowing the supposed rareness of the females, he will always retain them when they are caught, whereas he will continually pass by or let go the commoner males. Considering the abundance of many species of *Erebia*, I think that the collections brought home probably understate the numerical disproportion of the mature sexes.

The proportions given to the species considered afterwards are derived from my collection, and from the collections in the British Museum. Here again the risk run is one of understatement, for in the latter collection many specimens have been ejected, and these will be sure to have been mostly males, owing to the scarcity of females for representing types.

In applying the methods, that have now been discussed at some length, to actual data derived from the genus *Erebia*, my

object is to discover whether those data give any evidence as regards the hypothesis, that inequality in the numerical proportions of the sexes, when coupled with variability in the preponderating sex, tends towards continued fluctuation of the variable character. Of what nature, then, will the data be that will lend support to this hypothesis? It is a matter of very general observation that when the ordinary individual variations of a species are thrown into a scheme of distribution, the curve derived from them is normal. The essential property of a normal curve is that it falls away symmetrically on either side of M by regular gradations, the numbers becoming gradually less below, and more above the mean. Curves A and B in Fig. 1 are therefore not truly normal, but curve C is. [See Entom. Oct. 1901, p. 278.]

Now, on the theory under discussion, we would not expect the individual variations to fall into a normal curve, if the sexes are disproportional, &c.; there should be breaks in the continuity of the slope, if the principle in question has come into play. If, of course, we take individuals from many different areas, or from one very large continuous area, we might obtain a normal curve, owing to the whirligig of chance having brought in his revenges, and filled up the breaks of continuity in one area with individuals from another; but if we take individuals from one somewhat confined area, we should expect to find these breaks. By breaks in the continuity of the slope, breaks in the actual series of variations are not necessarily implied. The latter breaks, namely, when some variations are omitted altogether, might be accounted for by natural selection; but when in some confined area all the variations do occur, but not in such numerical proportions as to fall into a normal scheme, then the facts are most easily accounted for by the hypothesis that has been framed. A confirmatory test besides this of abnormality of slope would be in the M of individuals of some confined area not corresponding to M of other areas, taken separately or combined. The method then will be to fix on some species with numerical disproportion of sexes, to select some character of that species which is variable in the preponderating sex, then to determine if that character falls into a normal scheme or not when a group of individuals is considered that has been derived from some one confined area, and also if the M of those from the confined area is the same as the M of other areas taken separately or combined. The conclusions arrived at from the following data must be accepted tentatively, as my material is not large enough to ensure anything like accuracy.

(To be continued.)

GYNANDROUS EXAMPLES OF *AMPHIDASYS BETULARIA*.

MR. ALBERT HARRISON has been good enough to entrust to me six of the seven gynandrous *A. betularia* that he bred from a batch of ova obtained from a female specimen taken in the New Forest in June, 1900 (Entom. xxxiv. 203, 349). These specimens have been submitted to Sir George F. Hampson for examination. As it was not permissible to mutilate the insects in any way, attention has necessarily been confined to the secondary sexual characters, and the results of his examination have been tabulated by Sir George as follows:—

- | | | |
|--------|---|--|
| No. 1. | Right side ♂ antenna, frenulum, and retinaculum. | Left side ♀ antenna, frenulum, and retinaculum. |
| No. 2. | Right side ♂ antenna, frenulum, and retinaculum. | Left side ♀ antenna, frenulum, and retinaculum. |
| No. 3. | Right side antenna unipectinate, ♀ frenulum, ♂ retinaculum. | Left side ♂ antenna, ♀ frenulum, ♂ retinaculum. |
| No. 4. | Right side ♂ antenna, ♀ frenulum and retinaculum. | Left side ♀ antenna, ♀ frenulum and retinaculum. |
| No. 5. | Right side ♂ antenna, ♂ frenulum and retinaculum. | Left side ♀ antenna, ♀ frenulum and retinaculum. |
| No. 6. | Right side ♀ antenna, ♂ frenulum and retinaculum. | Left side ♂ antenna, ♂ frenulum and retinaculum. |

From this table we see that, as regards external organs, Nos. 1, 2, and 5 are each male on the right side and female on the left side. I find that the wings themselves also exhibit the same sexual differences, and if one may judge from the appearance of the anal segments of the body it would seem that these are also "half and half."

No. 4 appears to be a female in all respects except that it has a male antenna on the right side.

No. 3 has the wings on each side of equal size. There is a well-formed male antenna on the left side, but the right antenna is that proper to the female with some short pectinations along its lower side, an abnormal position.

Except that it has a female antenna on the right side, No. 6 appears to be a male specimen, and comes nearest to being a counterpart of either Nos. 1, 2, or 5. It is not, however, the exact reverse of either, because the frenulum and retinaculum on the right side are male in character.

RICHARD SOUTH.

NOTES AND OBSERVATIONS.

HAWK MOTH PUPATING IN BRANCHES OF TREES.—During February larvæ of *Panacra lignaria* were common here on *Pisonia aculeata*. One large creeper, which clambered up and over a tall tree, was quite denuded of its foliage by them. Whilst examining some shrubs and young trees which grew immediately underneath, I discovered many of the larvæ spun up therein; continuing my search, I found many more changing, and an occasional pupa, in the branches. Some were close to the ground, others being seven or eight feet therefrom, probably many more were higher up. Though larvæ of many of the Queensland Sphingidæ are known to me, this is the only species which I have observed to pupate above ground. I have referred to several of our experienced entomologists, and none of them have known of Sphingidæ pupating in trees.—F. P. DODD; Warburton Street, North Ward, Townsville, Queensland.

SCENT ORGANS OF HEPIALIDÆ.—During a lengthened experience with the southern Hepialidæ, I have always noticed a powerful and somewhat pleasant scent emanating from the male of *Charagia daphnandri* (should be *scotti*), and was for some time unable to locate the organ from which it proceeded, but finally discovered that the large hair-like tufts on the diminutive hind legs of this species gave forth the scent. It will be noticed that each of these hairs is enclosed from the base to some little distance above in a delicate skin, forming a gland. These glands proved to contain a yellowish fluid, the fluid possessing the strong scent so noticeable in freshly emerged and handled males of this species. In *ramsayi*, *cyanochlora*, *splendens*, and others, the tufts of the male are much smaller, and I have not noticed any pronounced odour arising from any of these. During the past two years I have bred out a series of the magnificent *mirabilis* of Rothschild, which is the largest and generally considered the finest of Queensland Hepialidæ; the male has the tufts largely developed, and they, too, give forth a powerful and sweet scent, which is also secreted at the base of the hairs. The scent from these two species does not finally depart until long after the insects have been placed away in the store-boxes.—F. P. DODD.

BAT KILLING A MOTH AT SUGAR.—While my sister, Miss Harvey-Jellie, was sugaring in a garden in Essex last September, a large bat swooped down just as she was approaching a tree, and, in the full light of the lantern, settled on the patch of sugar, demolished a *M. brassicæ*, and flew away.—B. HARVEY-JELLIE; Moorside, Hartlepool.

VARIETY OF THE MOTH HYPSA SUBTRACTA (Walker).—Having bred a very large number of specimens of *H. subtracta* last year, and several this, among which were a good many of the banded variety, and also a few other examples, I think a specimen which emerged to-day, September 8th, is worth noting. The fore wings are quite typical, but the right hind wing has a distinct band, which is totally different from the ordinary banded form; the other hind wing is like the type, all yellow. Besides those I have bred myself I have also seen a great number of others, but nothing like the one now recorded. The

specimen, which is a male, was bred from a pupa found by me about three weeks ago, and was not reared in confinement. The insect is now in the possession of P. T. Lathy, Esq., Enfield, England, to whom I forwarded it.—G. F. LEIGH; Musgrave Road, Durban, Natal.

HYMENOPTERA-ACULEATA OF THE OXFORD DISTRICT.—The report of the Oxfordshire Natural History Society and Field Club for 1900 (recently received) is accompanied by a list of the Aculeate Hymenoptera of the Oxford district. The species enumerated number two hundred and eight, and comprise ten Heterogyna, sixty-two Fossores, fifteen Diploptera, and one hundred and twenty-one Anthophila.

LIST OF BRITISH DIPTERA (2nd Edition).—Even if the addition to the faunal lists of some three hundred species, and still more numerous important emendations and alterations, had not indicated the pressing need of a new edition of Mr. Verrall's invaluable list of British Diptera, it appears that the original edition was exhausted, and that a reprint had become a necessity. Although the author is not yet satisfied with the list as regards accuracy and completeness, we are sure that this revised edition will be gladly welcomed by dipterists. In the preface, reference is made to the increased interest in British Diptera, and the hope is expressed that this may lead to the production of more perfect lists than is possible at present of such families as the Cecidomyidæ and the Mycetophilidæ.

CAPTURES AND FIELD REPORTS.

COLIAS HYALE AND SPHINX CONVULVULI IN WILTSHIRE IN 1901.—I wish to record the capture here last year, on Sept. 18th, of a female specimen of *Colias hyale*, which I released, upon identification. This is the first and only one I have seen in this neighbourhood during many years. I also caught a female *Sphinx convolvuli* on the evening of Sept. 23rd, which I restored to liberty; and I noticed this same insect, or others of its kind, on several subsequent evenings, at the flowers of *Nicotiana affinis*.—(Rev.) C. A. SLADEN; The Rectory, Alton Barnes, Pewsey, Feb. 14th, 1902.

OPHIODES LUNARIS: A CORRECTION.—In my record of the above species (*ante*, p. 25), I should have said that it was exhibited at the City of London Entomological Society on Dec. 3rd, 1901, not at the Entomological Society of London on the 6th.—T. WRIGHT; Heath Side, Warrington, Jan. 9th, 1901.

ODONATA, &c., AT CAMBERLEY, SURREY.—*Libellula depressa*, *L. quadrimaculata*, *Sympetrum striolatum*, *Æschna cyanea*, *Lestes sponsa*, *Agriopuella*, and *Pyrhosoma nymphula* were very plentiful at Camberley in 1900. I got several specimens of *Cordulegaster annulatus*, and three of *Orthetrum carulecens*, two of which were caught in an orchard. Of Coleoptera, I met with *Cicindela campestris*, *Cryptocephalus aureolus*, and *Cetonia aurata* continually, and a gardener gave me thirteen specimens of *Geotrupes stercorarius*, males and females, which he had caught on the way to Bagshot.—M. PALLIS; Tatōi, Aigburth Drive, Sefton Park, Jan. 4th, 1902.

HARPELLA BRACTEELLA. — A specimen of this rare species was brought to me for identification by Mr. J. T. Houghton, who took it in this town on June 23rd of last year.—(Miss) E. MAUDE ALDERSON; Park House, Worksop.

NOTES ON THE SEASON, 1901: MARCH-JUNE.—On the whole, collecting has, I think, been satisfactory during the past season. In the immediate neighbourhood a few unusual species turned up. *Colias hyale* was seen at Hither Green, Sept. 22nd, and others were heard of from there. An example of *Vanessa polychloros* was found indoors, as already reported, whilst both broods of *Cyaniris argiolus* were well represented. A single *Sphinx convolvuli* was brought to me Sept. 25th, which was taken at rest on some clothing in a yard near Lee station. It was unfortunately in battered condition, owing to having been kept alive in a cigar-box for three days. The usual species turned up, and single specimens of *Eupithecia succenturiata* and *Cosmia diffinis* (Grove Park) were taken. A black female *Amphidasys betularia* was secured, *in cop.* with a typical male, and was kept for eggs, of which she deposited a large number. Some of the larvæ fed up well, and we now have a good number of pupæ. A single larva of *Iodis vernaria* was taken at Grove Park.—F. M. B. CARR; 46, Handen Road, Lee, S.E.

THE PAST SEASON, 1901.—The season of 1901 which has just closed I have again found, with one or two exceptions, a good one for butterflies. On referring to notes, I find the first specimen observed was one of *Vanessa io*, at Clifton, Bristol, on March 12th, no doubt tempted forth from its winter quarters by a warm day. *Gonepteryx rhamni* appeared on the 13th of same month. The weather being again colder after this, *Pieris rapæ* was not noted before April 21st, and on the 25th *Lycæna argiolus* turned up. On the Cotswold Hills, in Gloucestershire, in May, I was pleased to find several kinds in fair abundance, as *Euchloë cardamines*, *Polyommatus phlæas*, *Lycæna icarus*, *Thecla rubi*, *Argynnis euphrosyne*, *Thanaos tages*, &c., and the "whites." During June and July, in North Wales, Merionethshire, *Argynnis aglaia* and *A. adippe* were frequently seen in favourable situations; also *A. selene* and, locally, *Melitæa artemis* (*aurinia*) and *Cænonympha pamphilus* were in abundance amongst the coarse grass on the uplands. *Vanessa urtica* was very frequently seen, and I was pleased to notice several specimens of *Polygonia c-album*, not far from Barmouth, and the "whites" were very abundant. *Thecla quercus*, also, was continually seen flitting over the oak trees, this, as is often the case, especially when the sun was declining in the afternoon. On passing through Bath, the second week in August, I found one evening, on one of the hill slopes, *Lycæna icarus* in greater abundance at rest than I think I have ever before noticed it. Without moving, several dozens might be counted on the stems of grass or plantain—so many as four specimens might be seen on a single grass stem alone. In West Somerset, at the end of August and through September, the butterflies then out have been generally seen, as *V. urtica*, *Chrysophanus phlæas*, *L. icarus*, *T. quercus*, &c., but *atalanta* I have not found so commonly as last season in Devonshire. *Pararge egeria* was noted so late as October 17th, and a specimen each of *V. io* and *C. phlæas* were the last butterflies of the season of 1901; these were seen on October 23rd. During the whole year not a single speci-

men of *Vanessa cardui* or *Colias edusa* has been noticed in the places above mentioned. My observations of the moths have been mostly confined to day collecting, excepting examining on one or two evenings many plants of the red valerian in North Wales, to which the common moths came plentifully, as *Xylophasia polyodon*, *M. brassicae*, *Hadena dentina*, &c.; the last seems generally common in many parts of Wales. The larvæ, pupæ, and imago of *Zygana filipendulæ* were extremely abundant near Barmouth—the pupæ spun up in all kinds of places, even on rocks, and wood palings; the imagines were most constant in their markings, excepting an occasional one with the spots rather smaller. *Macroglossa stellatarum* occasionally visited the red valerian in the same district, and later on I have now and then seen this insect in West Somerset, where, also, larvæ and pupæ of *Acherontia atropos* have been found not unfrequently. The larvæ of the “whites,” and, in one place apparently, of *Pionea forficalis* have been very destructive. I may, perhaps, add a word here for that often much abused bird, the house sparrow—of his usefulness, often forgotten, in destroying both the larvæ and imagines of troublesome insects. This season alone I have seen him devouring the larvæ of *Malacosoma* (*B.*) *neustria*, and *Cheimatobia brumata*, and imagines of *Phlogophora meticulosa* and *Triphana pronuba*. The dry, warm season appears to have been favourable to wasps; and in June and part of July the little chafer-beetle, the Welsh “Coch y bouddhu,” appeared in swarms near Barmouth, on the uplands. I noticed one day the surface of a tarn dotted over with struggling victims, and the bracken and low nut-bushes were at times covered with them.—T. B. JEFFERYS; Minehead, Nov. 4th, 1901.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*February 5th, 1902.*—The Rev. Canon Fowler, M.A., F.L.S., President, in the chair.—The President announced that he had appointed Mr. F. DuCane Godman, D.C.L., F.R.S., Professor E. B. Poulton, M.A., D.Sc., F.R.S., and Dr. David Sharp, M.A., F.R.S., F.L.S., as Vice-Presidents for the Session. Dr. Norman Joy, of Bradfield, near Reading, was elected a Fellow of the Society.—Professor Poulton exhibited with lantern a series of slides belonging to Professor Meldola, made from actual specimens by the three-colour process, illustrative of mimicry in British and exotic Lepidoptera and Hymenoptera. He also exhibited the several specimens from which the lantern-slides had been prepared. A discussion on the subject took place, in which Col. Swinhoe, Mr. F. Merrifield, Dr. Chapman, Mr. C. O. Waterhouse, the Rev. F. D. Morice, and Col. Yerbury took part, Mr. Verrall observing that in the case of Diptera they mimicked other groups rather than were mimicked by them, while there were even cases in which flies fed on dragonflies, and not *vice versâ*, as was usual. With regard to the protective value of the scent-glands present in groups allied to the Chalcosiinæ, and conspicuous also in *Anthrocera*, Mr. J. W. Tutt said it was possible that they might have something to do with edibility or

otherwise of the species. The glands, though better developed in the male, existed also in the female. Professor Meldola, however, supposed them to be characters of sexual attraction, as laid down by Fritz Muller, and therefore not affecting the question of distastefulness.—Mr. C. G. Barrett exhibited a series of the perfect insect of *Glottula fusca*, Hpsn., together with ears of maize (locally called mealies), showing the damage done by the well-grown larva of the species, which lives in the first place in the stem, eating the pith from the ground, and afterwards attacking the cobs, and eating from the inside into the bases of the unripe grains, which then change colour and shrivel up. He also exhibited: *Gynaniza maia* (male), Walk., and a drawing of the larva; *Nudaurelia menippe* (male), Feld., and drawing of larvæ; *Bombycomorpha bifascia*, Hpsn., circle of eggs, cocoons, and figure of larva; *Phissana flava*, Feld., food, cocoon, and figure of larva; *Gonometa postica* (male and female), Walk., cocoon (poisonous), and male and female larva figures; *Henucha smilax* (male and female), Feld., pupa, cocoon, figures of larva, and an enlarged segment to show markings; *Metarctia rufescens*, Walk., and figure of larva; *Taniopyga sylvana*, Walk., and figures of larva; *Rigema ornata*, Walk., and figures of larva—all the foregoing specimens and figures being received from Miss Frances Barrett, Buntingville, Transkei, South Africa.—Mr. W. L. Distant exhibited two specimens of Coleoptera which had reached him alive from the Transvaal—one *Anthia thoracica*, Thunb., now dead, the other, *Brachycerus granosus*, Gyll., still living, sent by Mr. Robert Service, of Dumfries, who received them from Sergt. Peter Dunn, of the volunteer company of the Scottish Borderers, which regiment was in the vicinity of Krugersdorp. The genus *Anthia* extends to the Southern Palæarctic region, and there seems little doubt that these species could be easily acclimatized there. All they require at home is the run of a good palm or orchid-house.—Mr. R. Adkin exhibited a series of *Acidalia aversata*. The parent moth (a banded female, the male parent not being known) was taken at Lewisham in June, 1900. Of the resulting larvæ about one-half fed up rapidly, and produced imagines in the autumn of the same year—a very unusual circumstance in the habits of the species; the remainder hybernated and produced imagines in June of the following year, thus occupying the normal time in completing their metamorphoses. The proportion of individuals following the female parent in the two portions of the brood were almost equal, the percentages being approximately fifty-three banded in the autumnal emergence as against fifty-eight in the spring, but in point of sex the disparity was great, over 65 per cent. of the autumn moths being males as against fully 72 per cent. females in the spring portion.—Mr. G. C. Champion exhibited long series of *Leptura stragulata*, Germ., and *Strangalia pubescens*, Fabr., from the pine-forests of Aragon and Castile, showing the great variation in colour of the two species in these districts, whereas the allied forms occurring in the same places, viz., *L. rubra*, Linn., *L. distigma*, Charp., *L. unipunctata*, Fabr., and *L. sanguinolenta*, Linn., were perfectly constant; also *Dermestes aurichalceus*, Küst., which he and Dr. Chapman had found everywhere in abundance in the old nests of the processionary-moth (*Cnethocampa processionea*, Linn.) on the pines in these forests.—Dr. T. A. Chapman exhibited in illustration of his

paper "On a new subfamily of Pyralidæ," living larvæ of *Hypotia corticalis*, Schiff, as well as preserved larvæ, pupa-cases, imagines, and prepared wings to show the neururation of that species. — Mr. Edward Meyrick, B.A., F.Z.S., communicated "Descriptions of new Australasian Lepidoptera." — Mr. W. F. Kirby, F.L.S., communicated a "Report on a Collection of African Locustidæ, chiefly from the Transvaal, made by Mr. W. L. Distant." — H. ROWLAND-BROWN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. — *January 9th, 1902.* — Mr. W. J. Lucas, B.A., F.E.S., Vice-President, in the chair. — Mr. Tonge, Redhill, Surrey, was elected a member. — Mr. Hewitt exhibited a specimen of the rare Homopteron, *Cicadetta montana*, taken flying in Stubby Copse, New Forest, on July 7th. — Mr. R. Adkin, five specimens of *Melanippe galiata*, which emerged on Dec. 8th last, in a cage outdoors and protected only from rain and direct sunshine. The ova were laid towards the end of August. — Mr. McArthur, specimens of *Triphæna comes*, bred on Dec. 26th and 27th, from ova laid in July by an Isle of Lewis female. — Mr. Main, slides made by himself of the larvæ of *Samia cecropia*, and of *Amphidasys betularia*; of the imago of *Pieris napi*, drying its wings after emergence from the chrysalis case; and of a batch of ova of *Macrothylacia rubi* on a sprig of heather.

January 23rd. — *Annual Meeting*, Mr. F. Noad Clark, Vice-President, in the chair. — The Twenty-ninth Annual Report was read, and showed that the Society was in a very satisfactory condition, both in membership and finances; and had carried on with much success its educational and scientific work. The present number of members is 174, and the balance-sheet showed a very fair balance, with no liabilities. — The following is a list of the Officers and Council elected for the ensuing year: — President, F. Noad Clark; Vice-Presidents, H. S. Fremlin, M.R.C.S., F.E.S.; E. Step, F.L.S.; Treasurer, T. W. Hall, F.E.S.; Librarian, H. A. Sauzé; Curator, W. West; Hon. Secretaries, Stanley Edwards, F.L.S., F.E.S., Hy. J. Turner, F.E.S.; Council, W. J. Ashdown, J. H. Carpenter, F.E.S., T. A. Chapman, M.D., F.E.S.; A. Harrison, F.C.S., F.L.S.; W. J. Lucas, B.A., F.E.S.; H. Main, B.Sc., F.E.S., and J. W. Tutt, F.E.S. — Mr. R. Adkin exhibited a long series of *Acidalia aversata*, and read notes on their life-history and variation. — Mr. Garrett, a living specimen of *Dasychira pudibunda*, which had just emerged in the open. — Dr. Chapman, forms illustrative of the geographical races in Spain and Switzerland of the butterflies *Polyommatus corydon*, *Lycæna damon*, and *L. hylas*. — Hy. J. TURNER, *Hon. Rep. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY. — *December 16th, 1901.* — Mr. G. T. Bethune-Baker, President, in the chair. — Mr. A. H. Martineau showed Hymenoptera from Tubney, near Oxford, in Berks, a sandy locality; they included *Cleptes pallipes*, *Crabro palmarius*, and *Nyssa dimidiatus*. — Mr. A. D. Imms showed empty cocoons and pupa-shells of *Ecophora sulphurella*, from Moseley. — Mr. G. T. Bethune-Baker, a collection of Liptenæ and Pentilæ, subfamilies of the Lycenidæ, from South Africa, which are remarkably mimetic; some were strikingly like Acraeidæ; others were very like Pieridæ, like some Geometridæ and many other groups of Lepidoptera, the resemblance being in

various degrees of perfection, in some cases almost perfect. There seemed no explanation for the resemblances to some species, such as some of the Geometrid forms.—Mr. C. J. Wainwright, a small collection of Chrysidids, including *Chrysis viridula*, from Wyre Forest; *C. succincta*, from St. Ives, Cornwall; *Hedychridium roseum*, from West Runton, Norfolk; *Ellampus cæruleus*, from West Runton; and West Hide, near Hereford; and *Chrysis pustulosa*, from West Hide.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

Insect Life: Souvenirs of a Naturalist—J.-H Fabre, D.-ès-Sc. Translated from the French. By the Author of 'Mademoiselle Mori.' With a Preface by D. SHARP, M.A., F.R.S. Pp. 320. London: Macmillan and Co. 1901.

A TRANSLATION generally declares itself as such; this one does not. Possibly this is due to the fact that, as Mr. Sharp says, Fabre is a difficult writer to translate. The book before us, which pictures to its readers the habits of a few beetles and Hymenoptera, is a translation of the first volume of Fabre's 'Souvenirs Entomologiques,' of which there are now seven series. If all are as interesting as this volume, we hope the rest may soon be presented to us in English garb. The writer is a genuine field-naturalist, and has a charming way of giving the details of his observations in such a way that the reader almost fancies he is making the observations for himself. The ingenuity, too, with which experiments in the field are made to assist the writer in his observations, takes hold of one and keeps his attention fixed in no ordinary manner. There are sixteen full-page pictures, but, though the insects portrayed on them are good, we hardly care for the style; this, however, is perhaps only a matter of taste.

W. J. L.

OBITUARY.

CHARLES LIONEL DE NICÉVILLE belonged to a noble Huguenot family, and was born at Bristol in 1852. In the year 1876 he proceeded to India, where he commenced the formation of a collection of butterflies, which he sold to the Asiatic Society of Calcutta some years afterwards. He travelled extensively in various parts of India, and at the time of his death had amassed one of the finest private collections of the butterflies of that country, which, we understand, has been purchased by the Indian Museum for Rs. 20,000 (about £1300). His first published papers were issued in conjunction with the late Prof. Wood-Mason, but he also published a great number of lists, with descriptions and illustrations of numerous new species of the butterflies of various parts of India, chiefly in the Journal of the Asiatic Society of Bengal, and in the Journal of the Bombay Natural History Society. But his most important work was the 'Butterflies of India, Burmah

and Ceylon,' of which three volumes—including the whole of the families Nymphalidæ, Lemoniidæ, and Lycænidæ—appeared from 1881 to 1890. The first volume was by Capt. G. L. F. Marshall and Lionel de Nicéville, but the remainder were by de Nicéville only. It is much to be regretted that this valuable work remains a fragment. Subsequently, Mr. de Nicéville was appointed Government Entomologist, Indian Museum; and it was while engaged in official investigations in the Terai, near Darjeeling, that he contracted the fever of which he died, at Calcutta, on Dec. 3rd, 1901. His death came as a shock to his numerous friends in India and Europe, and is a great loss to the cause of Indian entomology.—W. F. K.

MAJOR ALFRED FICKLIN.—On February 4th, at the comparatively early age of sixty-three, Major Ficklin succumbed to an attack of apoplexy, after an illness of but a few days' duration. As an entomologist he was essentially a practical one, and few perhaps knew better than he the collecting-grounds of north Surrey, and what they were able to produce in the way of Lepidoptera. Field-naturalists, therefore, of the south of London will miss greatly from their ranks his well-known figure. Major Ficklin was almost or quite one of the very first members of the South London Entomological and Natural History Society, of which he was President in 1880, and it is, perhaps, amongst members of that Society that he was best known, and by them his genial company and quaint entomological and fishing yarns (for he was a fisherman, too) will not soon be forgotten. It was his great delight to assist beginners in Entomology, and the members of a school Natural History Society in Kingston-on-Thames, where he so long resided, will, indeed, miss from their meetings and excursions one who was so expert a breeder of insects, so diligent a collector, and who possessed withal a manner so entertaining and so capable of winning the hearts of boys. The pursuit of Entomology, however, did not claim the whole of Major Ficklin's spare time. He was an artist of no mean order, and to his education at a school in one of the loveliest parts of the Rhine valley may be due the development of his artistic taste, and perhaps also we may here find the reason why he delighted to paint scenes on the rugged Cornwall coasts. On these painting excursions time was found for entomology, too, and it was under these circumstances that he made acquaintance with the Cornish form of *Dianthecia luteago*, which some entomologists have thought sufficiently distinct to need a varietal name, and have therefore termed var. *ficklini*. But even entomology and art did not exhaust the energies of Major Ficklin; for from August, 1860, he had been connected with the Kingston Volunteers, and from 1884 till his resignation in 1898 he was their commanding officer, while for many years during his long service he was one of the best shots of the battalion. Major Ficklin leaves behind him to regret his loss a widow, a daughter, and two sons, the elder of whom bids fair to keep up his father's reputation as an entomologist and an artist.—W. J. L.

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THE CLASSIFICATION OF GRACILARIA AND ALLIED GENERA.*

By T. A. CHAPMAN, M.D., F.E.S.

I DESIRE in these notes to point out that certain genera which I call collectively the Gracilariadæ are connected together by certain very definite characters of their larvæ and pupæ, and by the special nature of these characters are equally cut off and separated from certain other genera with which all our systematists, up to Staudinger, or rather Rebel, following his predecessors, have more or less mixed them.

These genera are *Gracilaria*, *Ornix*, and *Coriscium* as one subgroup, *Lithocolletis* as another, and *Phyllocnistis* as a third, together with several non-European genera, this group being much more abundantly represented in America than Europe.

As a subsidiary point, I associate *Lyonetia*, *Cemiosoma*, and *Bedellia* as a very natural group, crisply marked off by pupal characters from all other forms, with *Phyllobrostitis* as probably representing a connecting form.

This being so, it is of course merely a corollary that *Tischeria* and *Bucculatrix* must find their proper place somewhere else, and not in association with these two groups or families.

I hardly know whether classification founded in earlier stages has still to fight for recognition; I hope not—I may merely say that where good characters are to be found in the earlier stages, and none in the imagines for classification, then classification by such characters is imperative. Classification by any one character or by any one stage is liable to be very erroneous, and any true

* Read before the City of London Entomological Society, March 18th, 1902. Mr. J. Hartley Durrant has very kindly looked through these notes. I mention this in order to make grateful acknowledgment, and to indicate that no gross errors of bibliography or nomenclature occur in them, but of course without for a moment desiring to make him responsible for any of my heresies.—T. A. C.

classification will be supported by every fact that we can observe, whether it be a fact of habit or of structure, of the larva, or of the imago.

Every fact that tends to group species together may be proof of relationship, probably is, but it may be an instance of what is familiar to all as convergence. Every fact that separates two species unquestionably separates them. Whether specifically, generically, or more profoundly, will usually depend on its agreement or otherwise with other similar facts, as much as on its own apparent importance. In any case of two groups being so separated the presumption is strong that the relationships within each group are closer than of any members of one group to any of the others.

The great and very frequent exception to this is where two or more groups split up by a differentiation common to all of them, usually in some character that is liable to great variation under frequently occurring changes of environment. As an extreme case, admitting no doubt, I might illustrate by saying that many species of Lepidoptera have pale and melanic races. No one would suggest that the pale races all belong to one family or genus, and all the melanic ones to another. Or, we might say that all species having apterous females belong to one family. This is not so absurd an illustration as one might suppose, since I fancy there are still to be found entomologists who think *Psyche* and *Orgyia* are very closely related, practically on this ground only.

It is but recently that the Arctiad nature of the Syntomids has been fully acknowledged, and their resemblance to Anthrocercids (Zyganids) admitted to be convergent only. Whilst the likeness that obtains between the Nolidæ and Lithosiadæ appears strong enough to deceive the very elect.

The objections that are raised to consideration of the earlier stages in classification include two that I may allude to. The first is usually expressed in something of this form—Is not the imago the more complete and evolved form, and ought we not therefore to classify by it, and not by the larva or pupa? This proposition is open to two serious comments. The first takes note that the objector considers that classification is to be founded on one stage only, probably on one character, or at most on a very few characters, and, having so made his classification, anything that contradicts it in any way is necessarily wrong. The second comment is—he assumes that the upholder of the use of the earlier stages in classification possesses precisely the same narrow views, and is going to classify, say, by some larval character, and flout everything that does not agree with his results. The only excuse he has is, of course, that a certain element of this nature must always exist. Life is short and art is long, but science is longer still, and so we must all specialize,

and inevitably fall victims in some degree to our more or less narrow outlook.

Another objection raised is, that we cannot classify by early stages, because of our ignorance of them in so many instances. This would be a valid objection were it the case that the demand was to ignore the imago. Such an imputation is, however, pure delusion. All that is proposed is that all the light that the earlier stages throw on the relationships of species shall be used, where we know them; that what it tells us about *a* shall be accepted, and not ignored, because it happens to be silent about *b*.

There is little doubt that the value of a knowledge of the early stages for classification became very much neglected in the eighties and early nineties, probably in consequence of the enormous numbers of new species of exotic Lepidoptera constantly coming to hand and being constantly described with often no idea whatever of their earlier stages. The same causes are no doubt still very active in the same direction, but something is being done in the opposite direction by not a few active workers.

The truth being that we require every scrap of knowledge that we can get, about every species; that the early stages are quite as important as the imaginal, as illustrating relationships, probably often more than less so; but in any case, being further information, they often guide us readily in cases where imaginal indications are obscure, and must always be useful in checking imaginal results and enabling us to see whether we have correctly interpreted imaginal facts.

It is because facts in the earlier stages are very pointed and definite in separating Gracilariadæ and Lyonetiadæ from each other and from other genera that I have selected them, partly to illustrate this point, but chiefly to secure a better classification of those families as a subject for this paper.

The characters of the Gracilariadæ that I propose to deal with are two—one larval, the other pupal.

The larval character is the very peculiar modification of the mouth parts that exists in all the species in their first two instars, continuing for further instars in some species. In all—even in *Phyllocnistis*—changing suddenly at one moult to the ordinary form. In *Phyllocnistis*, the third moult is of this character, but the mouth parts are now useless for feeding, and only available for spinning the cocoon.

The pupal character consists in the movable or free segments being reduced to the 5th and 6th abdominal, as in the obtect pupa, but with the 7th also free in the male, and the habit of protruding from the cocoon for emergence. It is, in fact, the highest form of Incomplete Pupa, with the first four abdominal segments fixed. I know of no other family, genus, or species

possessed of this type of pupa. Since, however, it is the limiting form in one line of pupal evolution, I think it is not improbable that some other group of which I am ignorant may have attained a similar structure.

There can, however, be no question that these two peculiar specializations, of the early larva and of the pupa, are unlikely in the highest degree to occur together in any other group. It is possible, but convergence in this way can hardly be expected to produce an approach in two apparently independent and unrelated characters.

I may mention that, except where I use the facts recorded by the late Vactor Tousey Chambers, to which I refer below, I have depended for my data entirely on my own observations, and therefore have to leave alone a number of American and other exotic genera. Their places are tolerably obvious from imaginal characters which associate them with those genera which I have specially examined, but I have thought it better to say nothing about them, especially as space prevents my dealing in detail even with the material I have. As, for example, though I refer to only a few species of *Gracilaria* and *Lithocolletis*, I have actually examined the young larvæ of a considerable number of species, and the pupæ of a very large proportion of our British species.

The earliest reference I can find to the peculiar structure of the mouth parts of these larvæ is in Stainton's collected papers of Dr. Brackenridge Clemens.* Clemens seems to have noticed them as early as 1857 in *Phyllocnistis*, and to have been aware that they occurred in some *Lithocolletis*.

Stainton made reference to them in connection with *Phyllocnistis* in the 'Entomologist's Intelligencer' in 1860.

In the seventies this knowledge was fairly common property, and the facts had been more or less observed by many microlepidopterists. I know that at this period my friend Dr. Wood, of Tarrington, was familiar with the main facts, and we often discussed the questions of their origin and significance, as we did many others with reference to the Micro-Lepidoptera. My knowledge of the Micros is in fact largely due to information obtained in this way from Dr. Wood.

No one apparently published anything on the subject before Chambers's papers appeared in *Psyche*, in the 'Journal of the Cincinnati Nat. Hist. Soc.' and in the American 'Entomologist' in 1877 and following years. He worked the matter out very fully and carefully, ascertained the genera in which this structural modification occurred, and also, which is most important, that they did *not* occur in any others (so far as known). There are some details in which his work is open to extension

* These papers were originally published in the Pr. Ac. Nat. Sc. and Pr. Ent. Soc. of Philadelphia.

and emendation, but, broadly speaking, he had a complete grasp of the facts. He first, I think, pointed out the closeness of *Gracilaria* and *Lithocolletis*, now universally admitted, and would, I doubt not, had he lived and gained fuller confidence in the value of his own observations, have placed *Phyllocnistis* along with them. These papers of Chambers are characterized by a philosophical reasoning and careful observation, which will delight those who read them for the first time.

It is a little difficult by description to give you a clear picture of the specialization that occurs in the structure of these larvæ.

We have been asked, as an exercise in ontology, to consider the experiences and mental attributes that would be possessed by beings possessing only two dimensions and confined thereto, in the same way as we are confined within three. These larvæ not only had this question laid before them, but obviously experimented with a view to gain some actual knowledge on the subject. If a steam-roller went over an ordinary caterpillar, it might reduce it to some resemblance to these Gracilariads.

Their mouth-parts are profoundly altered. They are right away at the anterior angle of a flat triangular head. Each jaw is no longer a biting instrument, but a flat disc hinged at its proximal margin, and working to and fro in its own plane (that of the head and of the larva also), with a serrated margin that acts on anything in front of it like a circular saw. The two jaws may cross one another more or less, but they cut nothing between them; the cutting is done right in front by each separately. These jaws work between two thin membranous veils, one above and one below them; these are the labrum and labium. They are finely granulated and spiculated, but possess practically no palpi, no spinneret, nor any other structure, nor are any maxillæ to be detected, unless they are represented by certain obscure lines on the jaws.

In some species the appearance is as though the upper and lower veils were continuous at their margins, thus placing the jaws, as it were, at the mouth of a bag, from which they protrude sufficiently to show their cutting edge. Their manner of working suggests that this bag arrangement really exists.

The larvæ live beneath the cuticle of the leaf, which they separate from the parenchyma below by cutting through a row of cells by the circular saw action of the margins of their jaws. The fluid contents of the cells are thus set free, and fall at once into the mouth of the bag. It is probable that the sap is forced towards the œsophagus by the action of the jaws. Being confined between the veils above and below, the uncut leaf in front and the moving jaws laterally, it will be subject to a force-pump action like that of certain rotary pumps.

Chambers (American Ent., 1880, p. 260) deals at some length with the evolutionary questions that are provoked by

these curious modifications. He treats as quite open to discussion the view that these are the original forms of *lepidopterous trophi*, and that the ordinary forms are a further development, but decides against it. I think we may follow him here without the least hesitation. This group is a solitary one. There is no other group showing such modified structures, and it is a very long way indeed from being one of the lowest groups. So that it is improbable in the last degree that a primary condition like this is, if it be one, should be preserved here, and here only. This, when we consider only the Lepidoptera; but we have to remember that the ordinary form of *lepidopterous trophi* falls into line with that in other insects, whilst that of the early Gracilariad larva does not.

We are forced, I think, to conclude that this special form of larva is derived from the ordinary form by selective modification. Mr. Chambers speaks of these changes as degradation and elevation. There is a certain convenience in so doing. The absolute loss of labial and maxillary palpi, just like the loss of true legs and of prolegs, which occurs in so many other larvæ as well as these, may be spoken of as degradation. But the marvellous modification of the jaws and of the labrum and labium to enable a very special form of feeding to be carried out is rather elevation than otherwise. They are at least evolutionary changes. Whether we call them degradations or elevation is rather a matter of the personal equation of the observer than of the facts themselves. No doubt we incline to say that an organ that becomes more complicated is advancing, one that is simplified is degrading; and probably this is correct if we apply it to the organ considered, and not to the whole organism. With regard to our larva, it is specialized, therefore elevated; the jaws and labium and labrum are specialized, therefore an advance; the loss of palpi, &c., is a degradation; but the whole insect is advanced. In modification of any question of advance or retreat, we must remember that the lost processes, palpi, feet, &c., are merely in abeyance, not lost; their embryonic nuclei persist and give rise to them in the later stages.

The great interest from an evolutionary point of view of these larvæ is from a rather different aspect. Our ordinary view of larval evolution in the Lepidoptera is that during the whole of larval life selection is acting on the larva, and produces its greatest effect on the full-grown larva, and that the characters so acquired by the adult larva tend to pass backwards to earlier moults, so that a primitive condition may persist up to the last moult, or may be lost earlier, and we find as a very common occurrence some primitive condition present in the first instar, but not afterwards. And, finally, the backward pressure of evolutionary changes annexes the first instar also, and that

larva has no primitive condition, in any of its aspects that are so modified.

This picture of larval changes in the Lepidoptera is probably, to a great extent, a true one. Nevertheless, it is probably much less frequently so than we imagine.

Let us try to apply it to the Gracilarians. An ancestral larva has lived some sort of life as a leaf-miner, like a *Nepticula*, or a *Tischeria*, but in its last moult takes on the special structure of *Gracilaria*, and feeds in the Gracilarian manner, and then passes the change back to all the earlier instars. It is just conceivable; but to follow this life in its last skin, a *Gracilaria* would need a very large and very succulent leaf. It may perhaps be said that *Phyllocnistis* practically does this, though its last instar shows that even here this is not so; and we may derive the group from *Phyllocnistis*.

But how are we to get back in the later stages to the ordinary form of larva. The embryonal centres have lost the power to develop the ordinary trophi; they can develop Gracilarian trophi, and afterwards the imaginal ones. But the ordinary ones have been eliminated, and no suitable imaginal discs to give rise to them remain. It is not possible to picture a *Phyllocnistis* giving rise to a form with a larva possessed of ordinary mouth-parts. They are gone and cannot return. Any modification of the mouth-parts of *Phyllocnistis* larvæ that are possible would probably be less like the ordinary form than they are at present, though there is no reason why a modification might not occur fulfilling very similar functions to those of the ordinary trophi, but structurally they would be decidedly different. No such forms appear to exist.

When we remember that it is the first stage that is always Gracilarian, and that it persists into the second or some further stage, and that it is useful in very small larvæ only, and therefore especially in the first stage. That later there is always an ordinary stage, though not completely so in *Phyllocnistis*, since in it—this also is modified so as to possess no jaws, and only a spinneret as an actually functional organ—the conclusion is inevitable that the Gracilarian form arose by modification in the first instar, and thence moved forward into the second, and in other cases further.

This modification in the early instars of *Gracilaria* is by no means an isolated instance of such an occurrence, but it is probably the most pronounced and the most unmistakable case in which an early larval instar undergoes modification, independently of any change in the later ones.

We are familiar with the four stages of egg, larva, pupa, and imago, and that modifications may take place in any one of these, without any corresponding change necessarily occurring in any of the others. And we are tolerably prepared to find

changes in full-grown larvæ gradually pushing their way back to the earlier instars. What we learn here, however, is that each larval instar is a stage, comparable to the pupal or imaginal stage in its individual importance, and that it may undergo changes without necessarily involving any other instar, which holds to it the attitude of a separate stage.

In the larval state there are no doubt two conditions at work; the one is the tendency of a peculiarity acquired at any stage to be passed to the preceding and following stages—a tendency that will gradually produce an effect on these adjacent stages unless they resist it. This they will do should the peculiarity be such as to produce harmful effects if passed on to them. The other condition is that the full-grown larva has usually to adapt itself to conditions that are much more various than those affecting the young larva, and so the adult larva is much more liable to varied specialization than it is in its earlier instars.

Essentially, nevertheless, the young larva is just as liable to specialize in view of changed conditions as the adult one is.

This consideration, if we could always keep it in view, especially if we could recognize and understand the cases in which it occurs, would often assist us very much in overcoming difficulties that arise from supposing that young larvæ are always less modified than older ones; and especially that such modifications as they present are reminiscences of modifications acquired by the adult larvæ of some or other of their ancestors.

As a possible instance, I may remind you of the young larva of *Papilio machaon*. This larva seems obviously reminiscent of an adult *Vanessa* larva. Yet it is certain that, whether *Vanessa* be or be not derived from a *Papilio*-like form, *Papilio* is certainly not derived from any Nymphalid, nor is there any probability that any adult *Papilio* larva ever was spinous in precisely this manner.

The spines are a special development of the young *Papilio* larva for protective objects affecting itself. They have not been derived from spinous full-grown larvæ amongst their ancestors, and are not passed on to the present adult larva because it does not require them.

The processes on adult larvæ of *Ornithoptera* and of *Clytia* are not spinous, so as to be ancestral to those of young *Machaon*, but may themselves be derived from the spines of the first stage.

As I have said, however, this and other instances are open to some doubt, and the case of *Gracilaria*, in which doubt is difficult to insinuate, is useful, as giving us a standpoint different from that usually held.

(To be continued.)

VARIATION IN THE GENUS *EREBIA*.

By GEOFFREY SMITH.

(Concluded from p. 71.)

E. tyndarus (measurement of fore wings from apex to insertion in thorax; male and female variable. Proportion of females, 25 per cent.)—

Range in males . . . 15 mm. to 19 mm.

Range in females . . . 16 mm. to 19 mm.

These measurements are from fifty individuals collected in a confined area in Haute-Savoie. The males fell into a normal scheme, thus:—

3 per cent. measured under 16 mm.					
19	„	„	„	17	„
45	„	„	„	18	„
30	„	„	„	19	„
3	„	„	„	20	„

This is opposed to the theory, but the following considerations afford a possible explanation. From the specimens I possess I am strongly inclined to believe that the larger individuals of both sexes occur earlier in the year, and graduate down to the smaller as the season advances. By this means the variations are kept separate and constant in proportion, despite the disparity in number of the sexes, just as the numerical relations between so many distinct unvarying species would be kept unchanged from generation to generation, unless some outside influence, *e.g.* natural selection, disturbed those relations. From the variations being thus kept separate, the character of length of fore wing may be considered as a constant one from our point of view. We possibly see here a case of incipient seasonal dimorphism.

E. melampus (spot-power: male variable, female more or less constant at 7. Proportion of female about 10 per cent.).

In order to economise space, I will condense the remarks on this species.

The scheme derived from males of very different areas was normal, and gave a M of $6\frac{1}{3}$.

The scheme derived from males collected by myself in a confined area was abnormal; M was 5. The M of var. *sudetica* male is about 7.

E. ligea-euryale (spot-power: male and female variable. Proportion of female about 20 per cent.). The questions relating to the specific distinctness of these forms are very complex. In his list of the genus *Erebia* (Trans. Ent. Soc. 1898), Mr. Elwes separates the two as good species, but names such varieties as *E. ligea* vars. *adyte* and *livonica* as transitional to *E. euryale*.

Dr. Chapman (Trans. Ent. Soc. Sept. 1898), from considerations based on the forms of the gonapophyses, states that "the two recognized forms, *ligea*, with its vars. *adyte* and *ajanensis*, and *euryale*, with var. *ocellaris*, whilst usually distinct, are not always so, and in some places intermix." From my own experience, I am inclined to believe that there is only one true species to be derived from the numerous forms included under the two names *ligea* and *euryale*—that is to say, that any of those forms are capable of intercrossing and of producing any or all of the rest. I have collected from one confined area, namely, from a somewhat isolated mountain slope above the St. Gervais valley, the following forms: *ligea* (typical, with large ocelli), *ligea* (smaller, and with ocelli replaced by black spots, identical, in my opinion, with var. *adyte*), *euryale* (typical, with small ocelli), *euryale* (only conventionally separable both by clasp-form and wing-facies from *adyte* forms of *E. ligea*), *euryale* var. *ocellaris*. I can see no valid reason for doubting that these forms are specifically one. In order to bring out the degrees of resemblances and differences that exist between the two so-called species and their varieties, I have drawn up a table showing the amounts of ocellation possessed by them respectively. In giving numerical values to ocelli and spots, I have gone on the rough principle of counting two for an ocellus and one for an unpupilled spot, but I have had to use discretion further than this. The following table is made up from the specimens in the British Museum:—

TABLE.

16			16
15			15
14			14
13	ligea typ.		13
12			12
11			11
10			10
9			9
8	adyte		8
7			7
6			6
5	liponica		5
4			4
3			3
2			2
1			1
0			0

M 9½

M 8

M 6½

The facts to be deduced from this table are as follows : The whole range of variability in ocellation in the two forms taken together is from 16-0. Taken separately the two forms overlap one another at opposite extremities, the M of *ligea* being $9\frac{1}{2}$, that of *euryale* $6\frac{1}{2}$. Now, if the two are to be united into one species, the following conditions must be fulfilled—(1) the mean combined from the means of the two forms must equal the mean of the whole range of variability ; (2) the combined mean should fall at a point where the two forms confessedly pass over into one another. Now, it will be seen that both these conditions are satisfied by the table, for (1) $\frac{1}{2} (9\frac{1}{2} + 6\frac{1}{2}) = 8$, and (2) 8 falls at the point round which the two forms *adyte* and *euryale* type are grouped, and it is admitted that these are transitional forms.

I cannot give here the evidence derived from clasp-forms, though, to my mind, it is even more convincing than any that can be derived from wing-facies, because it is so unfailing in its application to other species of the genus. But anyone who has worked through a series of them, as I have done, will, I think, agree with the following remark of Dr. Chapman : "The clasp differences are not great enough to render this (identity of the two species) otherwise than likely where they occur together on the same ground." That the various forms do occur together more commonly than is supposed, I can only suggest by referring back to my own remarks and the following of Mr. Elwes : "The larger the number of specimens which are brought together from many localities, the more difficult it becomes to name those varieties ; and I have therefore dropped the names of a few which I had previously adopted, though I have not done so in cases where, as with many Asiatic forms, my knowledge is as yet insufficient to justify this course."

From the foregoing arguments it can easily be gathered that if we treat all forms of *ligea* and *euryale* as one species, we have here the kind of evidence that we set out to find. Collectors from different parts of the world bring back such different specimens of this species that separate varietal and even specific names are given to them ; as collections from these areas become more complete, intermediate links between these varieties and species are supplied, which show that all are only one species. The explanation I would give of these facts is that a casual collector in some area meets only with the M of that area (M being the mediocre or commonest condition) ; it is only after long collecting in the same area that the other terms of the scheme can be supplied. Now we saw that, according to our hypothesis, the M of different areas would probably be different, and this supposition is confirmed by the number of named varieties that exist which were supposed at first to be peculiar to some particular locality. But as collections become more perfect, it is found that what occurs as an habitual variation in one area

occurs as an occasional variation or aberration in another ; in other words, the M of one area is the M + or M - of another.

We expected also to find another piece of evidence, if the principle discussed in Part I. had come into play ; and that was that the schemes derived from separate areas should not be normal. Although my material is not sufficient to ensure anything more than some degree of probability, the scheme derived from the percentages of forms occurring in a confined area is not a normal one. There is too sharp a transition in numbers from those possessing large ocelli to those with the ocelli replaced by spots.

Further additions are much needed to confirm or correct the imperfect observations here recorded, both in regard to the species treated, and also other species of this and other genera.

To recapitulate the whole discussion—the two leading characteristics of the species of the genus *Erebia* are variability and numerical disproportion of sexes. These two characteristics are put into causal connection by the principle that equality in the numbers of the sexes tends towards equilibrium, *i.e.* constancy of hitherto variable characters, and that inequality when coupled with variability in the preponderating sex tends towards continued fluctuation of variable characters. This is effected in the following ways :—

When the sexes are equal in numbers constancy of characters is attained by—

1. Regular product of variability of one sex into constancy of the other, under undisturbed regulation of the laws of chance.
2. Regular product of variability of one sex into variability of the other, under undisturbed regulation of the laws of chance.

When the sexes are unequal in numbers fluctuation is preserved by—

1. Irregular product of variability of one sex into constancy of the other, the laws of chance acting irregularly.
2. Ditto, when both sexes are variable.

The evidence of the existence of this principle as a working factor would be that the individuals of a variable species satisfying the conditions of principle, and taken from a confined area, do not fall into a normal scheme with respect to the variable characters under consideration, although individuals taken from many areas very likely do so ; and also that the M of different areas would differ both from one another, and from the M of all the areas combined. Observations were then given on *E. tyn-darus*, *melampus*, and *ligea-euryale*, which tended to show that such evidence was forthcoming.

AN ADDITIONAL LIST OF BUTTERFLIES FROM THE RHONE VALLEY.

By A. F. ROSA, M.B, C.M.

IN relation to a list of butterflies published by me in the 'Entomologist' for February, 1900, the following are a few notes in comparison, and an additional list of species and varieties observed, during two subsequent visits of a fortnight and ten days respectively, in July (7th to 21st), 1900, and August (3rd to 13th), 1901.

On these two occasions practically the same ground was worked—*viz.* (1) the vicinity of Aigle; (2) the forest of Pfin; (3) Berisal and the Simplon route; with the exception that in August, 1901, a short stay was made at Zermatt, and the Nicolai Thal traversed.

With respect to the species included in the previous list, at Aigle, in July, 1900, the first seen was *Melanargia galatea*, which put in an appearance whenever there was the faintest glimmer of sunshine, the first day or two being wet and almost sunless.

Things looked brighter on the 9th, and from that date onward; but butterflies were decidedly scarcer than in the previous July, especially the *Lycænidae*. A few of *L. icarus* were noted, and of *L. corydon* and *L. damon*, which were abundant the year before, only one or two of each were seen. Wherever trees occurred by the road *Limenitis sibylla* flitted about, often in twos and threes, *L. camilla* being only represented altogether by one or two specimens; and it was the reverse the previous year as regards these two species.

Papilio machaon was frequently observed, and one was seen depositing ova on umbelliferous plants by the roadside. *Parnassius apollo*, as usual, becomes common as one ascends the road towards Le Sepey, and amongst others I secured one very large female specimen. *Euchloë belia* var. *simplonia* and *E. cardamines* were sparingly seen, as also was *Leptidia sinapis*. *Colias hyale* was common, but rarely in good condition; and of *C. edusa* a fresh brood was noted, but these were few and far between. *Thecla ilicis* and *T. spini* in worse condition than in the previous year; and of the *Vanessids*, *Polygonia c-album* was taken several times, the larvæ of *Vanessa io* occurred plentifully on nettles by the side of the road near Le Sepey, and one imago of *Pyrameis atalanta* was captured. The fiery *Melitæa didyma* was the commonest of its genus, which was otherwise represented by *M. phœbe* and *M. athalia*. The three large fritillaries *Argynnis aglaia*, *A. adippe*, and *A. paphia* turned up now and then; and *Satyrus hermione*, much smaller than in the previous July, was abundant. *S. actæa* var. *cordula*, *Pararge mæra*, *P. megæra*, *P. achini*, and many other common butterflies, as *Aporia cratægi*, *Gonepteryx rhamni*, *Satyrus semele*, etc., were taken or noted.

In the Pfin forest, July, 1900, butterflies at times were observed in great abundance. In the shady parts a fine brood of *Erebia ligea* was emerging, and *Lycæna arion* var. *obscura* was the same and in like condition (one of these has all the wings completely shaded). These two species were very plentiful, and so was *Argynnis latonia*, of which four or five more than once were noted within as many yards. *Limenitis camilla* here was fairly common, the difficulty being the scarcity of perfect specimens, many being chipped, although all were fresh. *L. sibylla* apparently does not occur in the forest.

In the smaller fields, especially where overrun with tall rank weeds, &c., *Papilio machaon* frequently occurred, and the larger fritillaries also frequented these hot sheltered spots, along with *Aporia crategi*, *Gonepteryx rhamni*, *Colias hyale*, and an occasional *C. edusa*, &c.

Leptidia sinapis and its var. *erysimi* also occurred commonly, and in the larger open fields *Lycæna corydon* was about in abundance, and at times *Melitæa athalia* arose in numbers at every step. *M. phœbe* was also taken, and *Satyrus hermione*, very small, probably some referable to *S. alcyone*; and, in addition to these, *S. actæa* v. *cordula*, *Epinephele lycaon*, and many others.

On the Simplon route, in the same year, the principal feature was the abundance of the Lycænidæ, not only as regards numbers, but as species and varieties, as *Lycæna ægon*, *L. argus*, *L. astrarche*, *L. eros*, *L. icarus*, *L. eumedon*, *L. bellargus*, *L. corydon*, *L. hylas*, *L. damon*, *L. minimus*, *L. semiargus*, *L. arion*, and seven other blues, which will be taken up in the list to follow.

Erebia euryale was also a conspicuous insect on account of its abundance, from above Brieg to well up the Simplon road above Berisal it was to be noted, as is its habit, congregated in little groups on the road. *Papilio machaon* was common on a steep embankment at a bend in the road above Berisal, and *Parnassius apollo* in the neighbourhood of Berisal. *Pieris callidice*, *P. napi* var. *bryoniæ*, and *Colias phicomone* were taken at and near the top of the Simplon, and *Cænonympha arcania* var. *darwiniana* on the Italian side.

Near Brieg *Colias edusa* was a passing and generally rapidly disappearing visitor, and below Berisal *C. hyale*, *Gonepteryx rhamni*, *Melitæa phœbe* (very common and varied), *M. didyma*, *M. athalia*; the larger fritillaries, *Argynnis aglaia*, *A. adippe*, and *A. niobe* (mostly var. *eris*), also *A. euphrosyne* and *A. pales*. *Chrysophanus virgaureæ*, *C. hippothoë*, *C. alciphron* var. *gordius*, near Berisal; and among the skippers, which were very common, *Carcharodus* (*Syrichthus*) *lavateræ* was frequently taken. *Melitæa dictynna* also occurred above Berisal, and, higher up, *Erebia tyndarus* and *E. melampus*.

In August, 1901, in those different districts, being a month later, I naturally expected to find many new things, but these anticipations were not realized, very few new species were observed. Many had disappeared, many still lingered on the wing, and a few were represented in their later broods, as *Colias hyale*, *Pararge megæra*, &c., in the Pfin Forest. *Pieris brassicæ* was much more common and generally distributed than I had previously observed it; and on the Simplon, *Erebia goante* was very plentiful, as also was *Pieris callidice* in the neighbourhood of the Schwarzee, on the Matterhorn.

The undernoted are the additional species and varieties taken or seen during these two seasons:—

PAPILIONIDÆ.

Papilio podalirius.—This species, which, as above indicated, was not seen in 1899, although assiduously looked for, was sparingly seen and taken on the road between Aigle and Le Sepey in early July, 1900, and also a few days later in the Pfin Forest. In August last it was very common in the latter locality, far more common than *P. machaon*. One white example of *P. podalirius* was taken at Aigle, July, 1900; and another, a fine specimen, was secured in the forest in August, 1901.

P. machaon var. *aurantiaca*.—One of this variety netted on the Simplon route above Berisal, and one or two others seen in the Pfin Forest, July, 1900.

Parnassius apollo var. *pseudonomion*.—One male near Aigle on the Le Sepey road in 1900.

P. mnemosyne.—Common in a field below Berisal from 15th to 18th July, 1900, the males being mostly worn and scarce; but the females were not difficult at this late date to obtain in good condition.

PIERIDÆ.

Pieris daphidice.—A few captured in the Pfin Forest in July, 1900, and in August, 1901, it was to be taken freely; a fine brood, nearly all in splendid condition, in the same locality.

Leptidia sinapis var. *diniensis*.—Common in the Pfin Forest last August.

Colias palæno.—Occasionally on the top of the Simplon and at the Ganter Bridge below Berisal in July, 1900. Also one pale male taken in the Pfin Forest the same year, which I believe is a low elevation for it in Switzerland.

LYCENIDÆ.

Zephyrus quercus.—One netted near Aigle in July, 1900.

Chrysophanus virgaurea var. *zermattensis*.—Common by the side of the road at Berisal, and frequently at Zermatt, and in a field in the Zmutt Thal, August, 1901.

Lycæna argus var. *ægidion*.—One of this blue variety of the female taken at Visp, and another near Loèche in August last.

L. zephyrus var. *lycidas*.—Between the second refuge and the Ganter Bridge on the Simplon road, which I believe is the best locality for it, I secured a series of this interesting blue between the 15th and 18th July, 1900, and probably more would have been taken

had it not been the case that *L. escheri* was in great profusion, and being of a more brilliant colour distracted one's attention.

L. baton.—Two at Berisal, July, 1900.

L. pheretes.—One in the Ganter-Thal, July, 1900.

L. orbitulus.—Fairly common in the same locality as last, and at the same time.

L. icarus ab. *icarinus*.—Occasionally at Berisal, July, 1900.

L. escheri.—As before mentioned, this species was in grand form between Brieg and Berisal, and especially abundant on nearing the latter locality, July, 1900. Also one large male taken in the Pfynwald, and a few in 1901.

L. meleager.—I accompanied a friend to the Pfin Forest who was in search of this insect in July, 1900; we did not identify the species until our return to the hotel, although we had both secured specimens. Its resemblance to *L. corydon* is at first sight very close, although the next day I had little difficulty in distinguishing it on the wing. It was apparently fairly common, and in August, 1901, although a month later in the season, the insect was still on the wing; the males were, however, rather worn, but not so badly as one would have expected.—*Ab. steveni*. The females taken are apparently of this form.

L. corydon var. *corydonius*.—One of this beautiful variety taken at Pfin, July, 1900.

L. alcon.—One male beyond the Hospice on the Simplon Pass, July, 1900.

NYMPHALIDÆ.

Apatura iris.—Other butterflies, especially the Lycenidæ, being comparatively scarce at Aigle in July, 1900, the presence of this fine species on the road contributed greatly to compensate for the deficiency. All those seen were males, and being very bold were frequently easily captured. Seven were seen in one morning, and of these four were taken; and on other days in smaller numbers. Only observed each day from about the time the sun struck the road (10 a.m. or later) till about noon. Generally settled on the dry white rock at the side of the road, or on the road itself. Only once on mule droppings, which were more frequently visited by *Satyrus hermione* and *Melitæa didyma*.

A. ilia.—The first strange butterfly seen in the Pfin Forest, July, 1900, was this, and the individual seemed to have an attraction for a special spot in a dry ditch, to which it returned several times after taking long flights. I eventually captured it later on in the day as it alighted on the leaves of a shrub. The species was not particularly common, three or four being the total catch—all males.

Limenitis populi.—Seen on three occasions in the Pfin Forest, July, 1900.

Polygonia c-album var. *hutchinsonii*.—One taken in the Nicolai-Thal, near Stalden, last August.

Vanessa antiopa.—One seen circling round near the top of some lofty trees at Aigle, and one worn specimen at rest on a wall near Brieg Station, July, 1900. Again at Aigle in August last, and not infrequently on the road between Loèche and Pfin.

Pyrameis cardui.—One or two in the Pfynwald, July, 1900; and in August, 1901, taken commonly in the same neighbourhood. Some of

them very diminutive, all freshly emerged, and frequently very richly coloured.

Melitæa didyma var. *alpina*.—Seen first on a wall at Aigle, and taken on the road to Berisal. Again taken last season at Aigle and Berisal.

M. phæbe var. *occitanica*.—Near Berisal, July, 1900; also var. *minor*.

Argynnis paphia var. *valesina*.—Stalden, Visp, and Aigle, August, 1901.

A. selene.—Several above Brieg, July, 1900.

A. dia.—Common in the Pfynwald last August; also one taken near Zermatt on the path to Staffel Alp.

SATYRIDÆ.

Erebia epiphron var. *cassiope*.—One on the Simplon above Berisal, July, 1900.—Var. *valesiana*. Two on the Matterhorn, August, 1901.

E. mnestra.—Two specimens on the Matterhorn, August, 1901.

E. æthiops.—Pfynwald, very large specimens; and one female of the var. *leucotania*, August, 1901.

E. euryale ab. *adyte*.—Many specimens of *euryale* taken on the Simplon, July, 1900, were of this form.

Satyrus dryas.—Sparingly at Aigle; but common in the Pfin Forest last season.

Pararge egeria.—One at Pfin, August, 1901.

HESPERIDÆ.

Augiades (Hesperia) comma.—Occurred in the Pfynwald last August.

Altogether during the three seasons about one hundred and forty-four species and named varieties were observed, and taken, with the exception of *Limenitis populi*.

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A FEW NOTES ON SOME OF THE BUTTERFLIES OF SYRIA AND PALESTINE.

BY MARGARET E. FOUNTAINE, F.E.S.

(Concluded from p. 63.)

Lycæna balcanica, Frr.—This exquisite little "blue" occurred during the last days of June in great abundance on the shores of the Sea of Galilee, and in other localities, always at low levels in Palestine; also on the Plain of Hûleh, below Bâniyâs. I generally found it flying round a small-leaved, prickly shrub, which grew in clumps in all these places.

L. gamra, Ld.—The butterfly, identified by Mr. Elwes as *L. gamra*, which I only met with in Palestine, was first seen by me just above the Sea of Galilee, but not found, like *balcanica*, down on the very brink of the lake. On the Plain of Jenîn, on July 3rd, when I was riding from Nazareth to the next halting-place, it literally swarmed; some of the specimens were in perfect condition, others not so fresh, so that I

would rather suggest the end of June as the time of appearance for this butterfly than the beginning of July.

L. trochylus, Fr.—Common round Beyrout and other places, at low levels, from May on throughout the summer. I do not recollect ever seeing it in Palestine.

L. galba, Chr.—Occurring at the same time in all the same localities as *gamra*.

L. lysimon, Hüb.—Only found by me on the Plain of Hûleh, near Bâniyâs, and nowhere else. *L. galba*, to which it bears a striking resemblance, did not occur in the same place.

L. loewii, Z.—I found these butterflies flying in some considerable numbers near Damascus, on a mountain rising immediately behind the Kurd village, the parched-up aridity of which baffles all description, being also more especially remarkable in contrast to the rich, fertile plain, where the white city of Damascus lies surrounded by gardens intersected with streams and watercourses. But, unfortunately, on the 8th of May and succeeding days upon which I visited this mountain, it was only with the greatest difficulty that I succeeded in taking any specimens of *loewii* worth keeping; the females especially were in very bad condition. I also took one male of this butterfly at Baalbek in June, but saw no others.

L. zephyrus var. *nicholli*.—I was particularly interested to take this variety, named after and discovered only a year ago by Mrs. Nicholl. At Baalbek, though I searched everywhere, I neither found the variety or the type; but at the Cedars, the first week in June, I was more fortunate, and took some remarkably well-marked specimens of var. *nicholli*.

L. anteros var. *crassipuncta*, Christoph.—I took a good series of this butterfly, mostly at the B'hamdoon Cedars, near Ain Zahalta, in April; also a few specimens, including one female from Bsherreh in June.

L. isaurica, Ld.—At the Cedars, males only, in June.

L. bellargus var. *polonus*, Z. (?).—This variety was fairly common in the dried-up bed of a stream, on the way to the Cedars from Bsherreh in June; the females, however, were rare, and I only took two specimens. In calling it *polonus* I am submitting to the superior knowledge of Mr. Elwes and Mrs. Nicholl, for it seems to me to approach much more nearly to *corydon* than *bellargus*, and to answer exactly to the description of var. *corydonius*, H. S.

L. admetus var. *ripartii*, Fr.—Common in the neighbourhood of Bsherreh and the Cedars in June.

L. poseidon, Ld.—I took several specimens of this species, at Baalbek, the Cedars, &c.; I cannot think it is a variety of *damon*, the males are so remarkably dissimilar, both sexes bearing a very striking resemblance to *damon* females. I should be interested to know if this is a distinct species or not.

L. semiargus var. *antiochena*, Ld.—Common near Maharain, in the neighbourhood of Ain Zahalta, in April; the females, which were much rarer than the males, were extremely beautiful, being shot with vivid blue on all the wings, in addition to the broad orange border. All the males had minute orange spots on the hind wings, near the anal angles on the upper side; more distinct, and on all the wings

beneath, in both sexes. I could not trace much resemblance to *semiargus* in either sex, either in size, shape, or colour.

Vanessa egea, Cr.—Common in most places, at no great elevation; a large, bright form. I do not recollect ever having seen such large specimens anywhere in Europe.

V. urticae var. *turcica*, Stgr.—Having found a quantity of "lesser tortoiseshell" caterpillars feeding, as usual, on nettles, on the southern slopes of the Jebel-el-Arz, at an elevation of some 7000 ft., on June 11th, I took about two dozen of the largest I could find. They all pupated in a few days, and in less than a week emerged into perfect insects, all more or less belonging to the var. *turcica*, and some very markedly so. Possibly the intense heat of Damascus, which place I had moved on to, was partly accountable for their very rapid emergence.

(*Melitæa*, F.—I have not been able to identify the species I took of this genus with sufficient certainty to give any satisfactory account of them. A series from Ain Zahalta, in April, I believe to be *M. arduinna*, Esp., but I am by no means certain of their identity. I certainly took a magnificent form of *M. didyma* var. *neera*, on a high mountain near Damascus, in May and, less decided, in a few other places.)

Argynnis niobe var. *eris*, Meig.—One every small specimen at the Cedars in June; black tracery above extremely scanty. I saw others.

A. pandora, S.V.—Common in several places. I saw one at Ain Zahalta on April 28th; was not this very early?

Danaïs chrysippus, L.—Fairly common on the Plain of Hâleh, round Beyrout, &c.; I should say, on the wing throughout the summer.

Melanargia titea, Klug.—At the mouth of the Dog River, and at Hadet, near Beyrout, throughout the month of May. It was on May 4th that I first saw one specimen up the Dog River, but unluckily I did not visit its particular haunt at the mouth of the river that day, which Prof. Day had kindly pointed out to me on a previous occasion; and when I did visit it, a week or two later, all the specimens were worn.

M. teneates, Mén.—Like Mrs. Nicholl, I also mistook this butterfly for *M. larissa* var. *herta*, when I first saw it, on the top of a mountain near Damascus, in May. It seemed to occur on all the high mountains throughout the summer, apparently producing a succession of broods, as fresh specimens were always to be met with, as well as others in as bad condition as they well could be. Perhaps it was most common on the comparatively lower regions of Mt. Hermon, towards the end of June; but, unlike most of this genus, instead of colonizing in groups in certain localities, it was widely distributed, and specimens generally occurred singly.

Satyrus anthe, O.—Abundant everywhere in the Lebanon and Anti-Lebanon; throughout the greater part of May and June; I do not recollect seeing it anywhere in July, or at all in Palestine. At the foot of a mountain near Damascus, on May 10th, it was freshly emerging in the early morning, and I took a number of specimens only just out of the chrysalis, with their wings still limp. The var. *hanifa* occurred everywhere with the type; this variety seemed to be confined to the females, though I took one male at Damascus very nearly approaching it in richness of tone.

S. pelopea, Klug.—Not out much before June, and very considerably less plentiful than the preceding, or the next species.

S. telephassa, Hüb.—Very common indeed; I should say it was out some eight or ten days earlier than *anthe* this year, but might vary according to the season. To me it appears quite distinct from *S. amalthea*, which I took some numbers of in Greece last year. The females were quite as common as the males, and this was also the case with *amalthea*.

S. stalilinus var. *sichæa*, Ld.—This variety was common in mountain gorges and ravines in Palestine early in July. I also took it near Beyrout, and at Alèy later in the month.

Ypthima asterope, Klug.—This little brown butterfly was common on the coast from April till August, and probably on till the autumn, evidently producing a succession of broods throughout the summer. I did not think it interesting; none of the specimens ever presented the slightest variation, being almost identical.

Pararge roxelana, Cr.—Not uncommon, and in excellent condition, near Bludân on June 20th. It flew in shady, narrow lanes. The specimens did not vary with those I have taken in Hungary, only in the extraordinary development of the hind wings from costa to outer margin.

Epinephele lycaon, Rott.—All along the lower slopes of Mount Hermon on June 28th. The specimens struck me as being paler in tone than the European form; indeed, the first male I saw I mistook for a large pale-coloured *Lycæna*.

E. ianira var. *telmessia*, Z.—In the grounds of the American College and other places near Beyrout in April and May. I found the female rare and difficult to secure a good series of.

Syrichthus tessellum var. *nomas*.—A very fine "skipper." I took single specimens in various localities in the Lebanon in May and June.

S. malvæ var. *melotis*, Dup.—Common in the Lebanon, May and June.

S. poggei, Ld.—On the top of a mountain near Damascus; fairly common early in May.

S. orbifer, Hüb.—Very common in many places in April and May.

Nisoniades marloyi, B.—I took one specimen and saw another near Ain Zahalta in April.

Hesperia nostrodamus, F.—I used to see this butterfly up the Dog River, &c., but never succeeded in getting a specimen worth keeping. I imagine, like most "black butterflies," it gets rubbed very easily.

Before concluding these notes, it may perhaps be of some use to other entomologists intending to visit Syria to mention some of the localities I found the best for collecting, with perhaps a few observations of a practical nature as well. Of these, I select three especially, *viz.* Ain Zahalta, Bsherreh, for the neighbourhood of the Cedars, and Bâniyâs, at the foot of the southern slopes of Mount Hermon. Ain Zahalta, which is reached by a four hours' walk over the mountains from Ain Sôfar, on the Beyrout-Damascus Railway, is a mission station, and accom-

modation—clean but rough—can be obtained during the spring months (which I should imagine was the best time for collecting here) at the house of a Syrian woman named Takla Abood, who speaks English; and in summer there is a mountain hotel. At Bsherreh, about one hour's walk or ride from the Cedars, situated in a magnificent position overlooking a glorious well-watered valley, there is now a new hotel, very small but most clean and comfortable, with the most obliging host and hostess, both of whom, having spent some time in Australia, can speak English. Bsherreh is approached on the west by a carriage-road, and is two days' drive from Beyrout by Tripolis; or, on the east over the pass of the Jebel-el-Arz, about ten or twelve hours' ride from Baalbek, with good collecting most of the way. At Bâniyâs I would willingly have made a much more protracted stay, as from what I did see I should say it was one of the best "butterfly corners" in Syria; but I only passed it as one of the halting-places on my ride from Damascus to Jerusalem, and not being provided with tents, the accommodation in the native house where I put up was of such a nature that my courage failed me at the thoughts of another night in Bâniyâs, so I decided to ride on to Giayoni. But I feel sure that for those who should be camping out, and therefore independent of the horrors of native houses, this neighbourhood would afford excellent collecting.

7, Lansdown Place (East), Bath: Dec. 1901.

A LIST OF LEPIDOPTERA COLLECTED BY DR. CUTHBERT CHRISTY IN NIGERIA.

BY EMILY MARY SHARPE.

(Concluded from p. 68.)

Family LYCENIDÆ.

46. LACHNOCNEMA D'URBANI, *Trimen*.—*a*. Jebba; May.
47. PILODEUDORIX CÆRULEA (*H. H. Druce*).—*a*, *b*, ♂. Juju-rock, Jebba; November.
48. VIRACHOLA LIVIA (*Klug*).—*a*. Juju-rock, Jebba; November.
This species was hitherto supposed to be restricted to Aden, whence there are specimens in the British Museum.
49. VIRACHOLA ANTALUS (*Hopff*).—*a-c*, ♂. Juju-rock, Jebba; November. *d*, ♀. Lokoja; May.
50. SUKIDION IASIS (*Hewits*).—*a*, ♂. Juju-rock, Jebba; November.

"*Pilodeudorix cærulea*, *Virachola livia*, and *Sukidion iasis* seem to frequent high ground, as I only came across these species on the Juju-rock."—C. C.

51. *SPINDASIS NILUS* (*Hewits.*).—*a*, ♂. Ilo ; February, 1899.

This is a very interesting species, hitherto represented by a female in the Hewitson Collection in the British Museum from the White Nile.

52. *AXIOCERSES PERION* (*Cram.*).—*a*, *b*, ♂. Ilo ; January. *c*, ♀. Lokoja ; May. *d-f*, ♂. Ilo ; March, 1899.

53. *LYCÆNESTHES AMARAH* (*Guér.*).—*a*, ♀. Ilo ; January, 1899.

54. *LYCÆNESTHES ADHERBAL*, *Mabille.*—*a*, ♂. Lokoja ; May.

55. *LYCÆNESTHES LARYDAS* (*Cram.*).—*a*, ♂. Lokoja.

56. *CACYREUS LINGEUS* (*Cram.*).—*a-c*, ♂. Jebba ; September, 1898.

57. *TARUCUS PLINIUS* (*Fabr.*).—*a-d*, ♂. Jebba ; May, September, November, 1898. *e*, ♀. Sierra Leone ; February, 1898. *f-i*, ♂. Rabba ; November.

58. *POLYOMMATUS BÆTICUS* (*Linn.*).—*a*, *e*, ♂ ♀. Jebba ; November. *f*, ♂. Boussa ; December. *g*, ♂. Rabba ; November.

59. *CATOCHRYSOPS FUMOSUS*, *Butl.*—*a*. Lokoja.

60. *CATOCHRYSOPS OSIRIS* (*Hopff.*).—*a*, ♂. Leaba ; December, 1899. *b*, ♂. Shonga ; August.

61. *EUCHRYSOPS NIGERLÆ*, sp. n.—Primaries : General colour bright azure blue ; the apex and hind margin narrowly lined with greyish brown ; cilia dirty white. Secondaries similar to the primaries ; the hind margin narrowly edged with greyish brown, the cilia nearly white ; a submarginal row of white spots with more or less obsolete dark centres, the darkest and largest spot situated between the first and second median nervule ; near the anal angle a second row of faintly indicated white spots. Underside similar to that of *Catochrysops contracta*, Butler. An extra row of spots on the marginal area of both wings, these spots being larger and more compact than in the above-named form, and consisting of four narrow lines of brown, with white spots on either side situated between the nervules ; the basal area of the secondaries relieved by the usual three black dots ; the distinct black spot on the hind margin edged on its lower side with metallic silver ; one spot between the second and third median nervule and two spots on the anal angle being of the same metallic colour. Expanse, '8 in.

Hab. ♂. Ilo ; February, 1899. Type.

62. *LAMPIDES HIPPOCRATES* (*Fabr.*).—*a*, *b*. Jebba ; September, 1899.

63. *NEOLYCÆNA CISSUS* (*Godt.*).—*a-e*, ♂. Shonga ; August. *f*, ♀. Jebba ; November.

64. *ZIZERA KNYSNA* (*Trimen.*).—*a-d*, ♂ ♀. Jebba ; September and October.

Family PIERIDÆ.

65. NYCHITOMA ALCESTA (*Cram.*).—*a, b*. Jebba ; May, October.
c. Lokoja.

66. MYLOTHRIS CHLORIS (*Fabr.*).—*a, ♂*. Shonga ; September.

67. PHRISSURA SYLVIA (*Fabr.*).—*a*. Mount Patti, Lokoja ;
May, 1899.

68. GLUTOPHRISSA SABA (*Fabr.*).—*a-d, ♂*. Jebba ; May, October.
e-g, ♂ ♀. Mount Patti, Lokoja ; May, 1899. *h, ♂*. Boussa ; December.

69. BELENOIS GIDICA (*Godt.*).—*a, ♂*. Jebba ; May.

70. BELENOIS ABYSSINICUS (*Lucas*).—*a, ♂*. Ilo ; January, 1899.

71. BELENOIS CREONA (*Cram.*).—*a-i, ♂ ♀*. Ilo ; March, 1899.
j, ♂. Rabba ; November. *k-m, ♂ ♀*. Jebba ; September, 1898.
n-r, ♂ ♀. Mount Patti, Lokoja ; May, 1899. *s, ♂*. Lokoja ;
May. *t, ♀*. Juju-rock, Jebba ; November.

72. BELENOIS MESENTINA (*Cram.*).—*a, b, ♂*. Ilo ; March. *c, ♂*.
Rabba ; November.

73. BELENOIS CALYPSO (*Drury*).—*a-c, ♂ ♀*. Ilo ; March, 1899.
d, ♀. Lokoja ; May.

74. PINACOPTERYX ? LILIANA (*Grose Smith*).—*a, ♀*. Ilo ; Feb-
ruary, 1899.

75. TERACOLUS MAIMUNA (*Kirby*). *Teracolus maimuna*, E. M.
Sharpe, Monogr. Ent. i. p. 24, pl. 9, figs. 1-19 (1898).—*a, ♂*.
Jebba ; September, 1898.

76. TERACOLUS AMELIA (*Lucas*).—*a, b*. Ilo ; February and
March, 1899.

This species has been recorded from Senegal and Abyssinia,
and seems therefore to range throughout the Soudan.

77. TERACOLUS DEDECORA (*Feld.*).—*a-i, ♂ ♀*. Ilo ; January,
February, 1899.

The occurrence of this species in Nigeria is of great interest,
as it has previously only been recorded from Senegal, in Western
Africa. It is a well-known species in North-eastern Africa,
where it ranges from Abyssinia to Somali-land, and eastward as
far as Muscat, in Arabia.

78. TERACOLUS EVIPPE (*Linn.*).—*a-l, ♂ ♀*. Jebba ; September,
November, 1898. *m, ♂*. Ilo ; March, 1899. *n, o, ♂ ♀*. Mount
Patti, Lokoja ; May. *p-s, ♂ ♀*. Lokoja ; May.

79. TERACOLUS LOANDICUS, *Butl.*—*a*. Lokoja ; May.

80. TERACOLUS EVAGORE (*Klug*).—*a-e, ♂ ♀*. Ilo ; January,
February, 1899.

I am unable to separate Dr. Christy's specimens from those
in the British Museum from Aden, from which place the British
Museum contains a large series.

81. TERACOLUS ISAUURA (*Lucas*).—*a-c, ♂*. Jebba ; September
and November, 1898.

This eastern species is here recorded for the first time from Nigeria. The British Museum has specimens from the White Nile and Upper Egypt, Abyssinia, and the Arusa Galla country and Mombasa.

82. *TERACOLUS SIMPLEX*, *Butl.*—*a-d*, ♂ ♀. Ilo; February and March, 1899.

The occurrence of this southern species is somewhat extraordinary, but my father tells me that in the Hinterland of the Gold Coast some South African species of birds, which have not been found in the intervening districts of Africa, occur quite unexpectedly.

83. *TERACOLUS XANTHEVARNE*, *Butl.*; E. M. Sharpe, *Monogr. Ent.* p. 90, pl. 29, figs. 1-11 (1900).—*a, b*, ♂ ♀. Ilo; January, February, 1899.

This species has hitherto only been known from North-east Africa; the specimens in the British Museum being from the Anseba Valley, Bogos-land, Abyssinia, and the White Nile.

84. *LEUCERONIA ARGIA* (*Fabr.*).—*a*, ♂. Mozum, Benue River; June, 1899.

85. *LEUCERONIA PHARIS* (*Boisd.*).—*a-c*, ♂ ♀. Mozum, Benue River; June, 1899.

86. *CATOPSILIA FLORELLA* (*Fabr.*).—*a*, ♂. Ilo; January, 1899. *b-f*, ♂. Mount Patti, Lokoja; May, 1899.

87. *TERIAS BRENDA*, *Doubl. & Hewits.*—*a*. Mozum, Benue River; June, 1899.

88. *TERIAS ORIENTIS*, *Butl.*—*a*. Sierra Leone; February, 1898. *b, c*. Jebba; September, 1899. *d, e*. Ilo; March, 1899.

89. *TERIAS HAPALE*, *Mabille.*—*a*. Ilo; January, 1899. *b*. Boussa; December.

90. *TERIAS REGULARIS*, *Butl.*—*a-c*. Jebba; September and October, 1899. *d-f*. Shonga; August.

91. *TERIAS BRIGITTA* (*Cram.*).—*a, b*. Sierra Leone; February, 1898. *c*. Jebba; October. *d-j*. Ilo; January, February, and March, 1899.

92. *TERIAS ZOE*, *Hopff.*—*a-e*, ♂ ♀. Jebba; September and October, 1898. *f*, ♂. Rabba; November.

Family PAPILIONIDÆ.

93. *PAPILIO DEMODOCUS*, *Esper.*—*a-f*. Lokoja; May. *g-k*. Mount Patti, Lokoja; May, 1899. *l, m*. Ilo; February, 1899.

"Frequented a species of orange tree."—C. C.

94. *PAPILIO PYLADES*, *Fabr.*—*a-c*. Jebba; May and November. *d*. Rabba; November. *e*. Ilo; March, 1899. *f*. Mount Patti, Lokoja; May, 1899.

95. *PAPILIO LEONIDAS*, *Fabr.*—*a*. Lokoja; May. *b*. Mozum, Benue River; June, 1899.

Family HESPERIDÆ.

96. SARANGESA SYNESTALMENUS (*Karsch*).—*a, b.* Boussa ; December.

97. HESPERIA DROMUS (*Ploëtz*).—*a-c, ♂ ♀.* Shonga ; August.

98. PARDALEODES INCERTA (*Snellen*).—*a.* Sierra Leone ; February, 1898. *b, c.* Lokoja ; May.

99. AMPITTIA ? INORNATUS (*Trimen*).—*a.* Shonga ; August.

100. GEGENES HOTTENTOTA (*Latr.*).—*a, ♂.* Boussa ; December.

101. GEGENES LETTERSTEDTI (*Wallengr.*).—*a.* Shonga ; August, 1898.

102. PARNARA BORBONICA (*Boisd.*).—*a.* Jebba ; November.

103. BAORIS FATUELLUS (*Hopff.*).—*a.* Sierra Leone ; February, 1898. *b-f.* Jebba ; October and November. *g-h.* Lokoja ; May. *i.* Rabba ; November.

“This species has the peculiar habit of frequenting one’s tent at dawn of day. It flits about in every corner in a restless manner, and is easy to catch. When the sun gets well up it disappears. It was common every morning on Mount Patti, and also at Boussa, in the hospital, flitting about beneath the beds and elsewhere.”—C.C.

104. BAORIS NETOPHA (*Hewits.*).—*a.* Lokoja.

105. PLATYLESCHES BATANGÆ (*Holl.*).—*a, b.* Lokoja ; May.

106. RHOPALOCAMPTA FORESTAN (*Cram.*).—*a.* Jebba ; September. *b-g.* Lokoja ; May.

Family SPHINGIDÆ.

107. PSEUDOSMERINTHUS SUBMARGINALIS (*Walk.*).—*a.* Jebba ; November.

108. LEUCOPHLEBIA AFRA.—*Leucophlebia afra* (*Karsch*), Ent. Nach. Berlin, xvii. p. 2, pl. 1, fig. 1 (1891). *a.* Ilo ; February, 1899.

109. NEPHELE PENEUS (*Cram.*).—*a.* Jebba.

Family SYNTOMIDÆ.

110. SYNTOMIS INTERNIPLAGA (*Mabille*).—Hampson, Cat. Lepid. Phalænæ, vol. i. p. 114, pl. 11, fig. 16 (1898). *a.* Lokoja.

Family ARCTIADÆ.

111. ALPENUS ÆQUALIS (*Walk.*).—*a.* Mozum, Benue River ; June, 1899.

112. DIACRISIA LUTESCENS (*Walk.*).—Hampson, Cat. Lepid. Phalænæ, iii. p. 295, 1901. *a.* Mount Patti, Lokoja ; May, 1899. *b.* Lokoja.

113. UTETHEISA PULCHELLA (*Linn.*).—*a.* Jebba ; October, 1898.

Family HYPSIDÆ.

114. ARGINA CINGULIFERA (*Walk.*).—*a, b.* Jebba ; November. *c.* Shonga ; August, 1898.

Family LIPARIDÆ.

115. *LÆLIA SETINOIDES* (Holland).—*a*. Lokoja.

Family LYMANTRIADÆ.

116. *CIMOLA ELEUTERIA* (Stoll.).—*a-c*, ♂ ♀. Mozum, Benue River; June, 1899.

"This species was seen frequently whilst traversing the thickest jungle on the right bank of the Benue."—C. C.

117. *DASYCHIRA* sp.—*a*. Mount Patti, Lokoja; May, 1899.

118. *DASYCHIRA REMOTA* (Druce).—*a, b*. Lokoja; December, 1899.

Family LIMACODIDÆ.

119. *PARASA URDA* (Druce).—*a*. Mount Patti, Lokoja; May, 1899.

120. *CHILENA* sp.—*a, b*. Ilo; January and March, 1899.

Family NOTODONTIDÆ.

121. *ZANA* sp.—*a*. Mount Patti, Lokoja; May, 1899.

Family SATURNIIDÆ.

122. *BURNEA CHRISTYI*, E. M. Sharpe, Ann. & Mag. Nat. Hist. (7) iii. p. 371 (1899). ? *Burnea phædusa* (Drury), Walk. Lepid. Heter. v. p. 1229 (1855).—*a*. Jebba.

Sir George Hampson considers my *B. christyi* to be a variation of *B. phædusa*, Drury. As, however, there is another specimen in the British Museum from Nigeria, which agrees with my type in having the large ocelli on the fore wing, I think it is quite probable that the two species are distinct.

123. *BRUNÆA PYGMÆA*, Maassen, Beiträge zur Schmett. f. 100. *Nudaurelia jebba*, E. M. Sharpe, Ann. & Mag. Nat. Hist. (7) iii. p. 372 (1899).—*a*. Jebba; October, 1898.

124. *SALASSA MAIA* (Klug).—*a*. Jebba.

125. *HENUCHA SMILAX* (Westw.).—*a*. Jebba; November.

Family LASIOCAMPIDÆ.

126. *METANASTRIA* ? *CONTRARIA* (Walk.).—*a*. Jebba; November.

127. *GONOMETA CHRISTYI*, sp. n.—Primaries: Ground colour reddish buff, somewhat paler in colour on the hind margin; two transverse bands of a darker tint across the centre of the wing, the basal line proceeding straight from the costa to the inner margin. Secondaries: Yellowish buff with a satiny appearance, rather deeper in colour along the inner margin and the base. Under side: General colour reddish buff, the secondaries paler, especially on the hind margin. Head, antennæ, thorax, and body reddish buff. Expanse of male, 3·6 in.

Hab. Jebba; November.

Female.—Primaries bright reddish buff, with three darker transverse lines, the two basal lines being only slightly waved; a faint suffusion of grey along the inner margin, and extending over the discal area to the costa. Secondaries lighter in colour than the primaries, and with a satiny gloss. Under side similar to that of the male; the hind marginal area of the secondaries lighter in colour than the ground colour; both wings devoid of any spots or lines. Head, antennæ, thorax, and body reddish buff, the latter having a distinct gloss. Expanse, 5·6 in.

Hab. Jebba; November.

“The cocoons of this species were frequently seen on some of the largest trees growing near the river bank at Jebba, not far from the Juju-rock. They were usually placed in a cluster on the under surface of a large bough. The caterpillar, an enormous ‘woolly bear,’ which I always associated with these cocoons, was on several occasions brought to me in camp. Its colour was dark reddish brown, much darker than the colour of the dead hair woven into the cocoons.”—C. C.

Family COSSIDÆ.

128. *AZYGOPHLEPS INCLUSA* (Walk.).—*a.* Jebba; November.

Family NOCTUIDÆ.

129. *SPHINGOMORPHA MONTEIRONIS* (Butl.).—*a-e.* Jebba; May.
 130. *CYLIGRAMMA LIMACINA* (Guér.).—*a, b.* Lokoja, 11,000 ft. above the river; May.
 131. *OPHISMA INDICABILIS* (Walk.).—*a.* Lokoja; May.
 132. *OPHIUSA MELICERTE* (Drury).—*a.* Leaba; December, 1899.
 133. *REMIGIA ARCHESIA* (Cram.).—*a.* Mount Patti, Lokoja; May, 1899.
 134. *PLECOPTERA RESISTENS* (Walk.).—*a.* Ilo; March, 1899.
 135. *ENTOMOGRAMMA PARDUS* (Guen.).—*a.* Jebba; May.
 136. *HYPOCALA PLUMICORNIS* (Guen.).—*a.* Jebba; May.
 137. *CHARIDEA CAUTA*.—*Charidea cauta*, Hampson (in MSS.).
a. Mount Patti, Lokoja; May, 1899.

Family GEOMETRIDÆ.

138. ? *ACROPTERIS ANGULATARIA* (Fabr.).—*a, b.* Jebba; May and October, 1899.
 139. *PARUMELEA PERLIMBATA* (Guen.).—*a.* Sierra Leone; February, 1898.

Family PYRALIDÆ.

140. *PHRYGANODES QUADRIGUTTATA* (Walk.).—*a.* Sierra Leone; February, 1898.
 141. *GLYPHODES SINUATA* (Fabr.).—*a.* Mozum, Benue River; June, 1899.

ON SOME NEW GENERA AND SPECIES OF HYMENOPTERA (ICHNEUMONIDÆ, CHRYSIDIDÆ, FOSSORES, AND APIDÆ).

By P. CAMERON.

ICHNEUMONIDÆ.

AMBLYJOPPA, gen. nov.

Antennæ stout, slightly compressed and dilated between the middle and the apex. Scutellum roundly convex, raised above the level of the mesonotum; its sides not margined, the apex with a flat, oblique slope. The base of the median segment has a distinct oblique slope; the areola is somewhat horseshoe-shaped, slightly narrowed behind; it is flat, raised, smooth and shining; the sides, except at the apex, are furrowed, the furrows becoming wider and striated towards the apex; the posterior, median, and the spiracular areæ only are clearly defined; there are no spines or projections, and the apex of the segment has a gradually rounded slope. Areolet narrowed at the top. Abdomen closely punctured; the segments are closely punctured and do not project much at the apex laterally. Legs stout; the apex of the hinder femora does not extend beyond the third segment. The post-petiole is wide and clearly separated; on the second segment only the part between the gastrocœli is striated. The abdomen is comparatively short, being not much longer than the head and thorax united; its apex is bluntly pointed and broad; it is not quite half the length of the penultimate; the ovipositor is broad and projects.

The temples are obliquely and rather sharply narrowed; the occiput is roundly incised, and is sharply margined; the malar space is large; the apex of the clypeus is transverse; the labrum slightly projects; the second joint of the maxillary palpi is widely dilated; the mesopleural tubercles are long, narrow, and plate-like; the ventral keel extends on to the fourth segment, and is not very distinct. There is a short stump of a nervure on the cubital-disco nervure. The wings are dark-coloured.

The species I have included in this genus are large handsome insects. The characteristics of the genus are the roundly convex scutellum and the flat, raised, smooth and shining areola. The median segment is completely areolated; there are three basal and five apical areæ, besides the spiracular area. The basal joints of the flagellum are elongated, more than three times longer than wide; the transverse median nervure is not quite interstitial; the transverse cubital nervures may be distinctly separated above, or they may be almost united.

To this genus belongs "*Ichneumon*" *elvanus*, Cam.,* which appears to be a common Indian species.

AMBLYJOPPA RUFO-BALTEATA, sp. nov.

Nigra, capite thoraceque flavo-maculatis; abdominis medio late

* 'Manchester Memoirs,' xl. pt. 4, p. 8.

rufo, apice petioli flavo; pedibus nigris; tibiis tarsisque late flavis, tarsis nigro-maculato; alis fusco-violaceis, nervis stigmatæque nigris. ♀.

Hab. Khasia Hills (coll. Rothney).

Antennæ stout, slightly dilated and compressed before the middle; the tenth to fifteenth joints white below; the scape minutely punctured, thickly covered with white pubescence. Head black; the face, clypeus, labrum, except in the middle, the inner orbits, the outer on the lower half—narrowly above, broadly below, the yellow extending to the base of the mandibles—pale yellow. Face and clypeus punctured, thickly covered with short white hair; the front above closely punctured. Thorax black; the edge of the pronotum, two short lines shortly behind the middle of the mesonotum, the scutellum, post-scutellum, two somewhat triangular marks on the sides of the metanotum, extending on to the spiracular area, the tubercles, a large mark on the under side of the mesopleuræ—rounded in front, obliquely narrowed at the apex—pale yellow. Mesonotum opaque, distinctly punctured in the middle, less distinctly and more closely on the sides; and thickly covered with short fuscous pubescence. Scutellum roundly convex, punctured, and thickly covered with long pale hair; post-scutellum smooth, thickly covered with fuscous hair. Median segment rugosely punctured; the supramedian area has the basal half narrowed; the base in the middle transverse and slightly more than half the width of the apex; inside it is not depressed, is smooth and shining; the apex with two rows of punctures, the basal row not reaching to the sides; the posterior median and posterior intermedian areas are stoutly transversely striated, the latter more strongly than the former. Pro- and mesopleuræ closely punctured, their apices more or less striated; metapleuræ closely rugosely punctured, above the middle keel more or less obliquely striated. The lower part of the stigma and the apical nervures are fuscous; the areolet five-angled, at the top half the width of the bottom; the recurrent nervure is received shortly behind the middle. Legs black; all the trochanters, the four anterior coxæ, the apices of the four anterior femora, the anterior tibiæ in front and at the base behind, the basal part of the intermediate to shortly beyond the middle and the basal two-thirds of the hinder pair, and an irregular mark on the top and sides of the hinder femora—broad above, narrow on the sides—pale yellow; tarsi pale yellow, the basal three joints at the apex and the apical two entirely black. Abdomen black; the apex of the petiole yellow; the second and third segments entirely, and the base and sides of the third, ferruginous. The petiole is depressed in the centre above, the base irregularly roughened; the apex rugosely punctured; the base of the post-petiole rugosely punctured; the apex less strongly punctured; the sides are closely, strongly, obliquely striated; the second, third, and fourth segments are closely punctured; the second closely, longitudinally striated at the base; the gastrocœli on their inner sides with curved striæ.

ACANTHOJOPPA, gen. nov.

Antennæ dilated and compressed beyond the middle. Scutellum pyramidal, the base with an oblique slope; the top roundly depressed; the sides of the top leaf-like; the apex has a more abrupt slope, is

shorter, and has its sides keeled. Median segment completely areolated; the base in the middle is depressed; there are five basal areas and three apical ones; the areola is completely defined; its base transverse; its sides oblique; the sides at the apex are oblique; the apex rounded inwardly. The spines are long and stout; the basal depression is keeled laterally. Face flat, hardly projecting in the centre; the labrum projecting. Occiput widely incised. Temples broad, obliquely narrowed. Areolet five-angled, narrowed at the top; the cubito-disco nervure has an almost obsolete stump of a nervure. Wings hyaline, or slightly infuscated at the apex. Legs long; the apex of the hinder femora reaches to the fourth segment. Petiole long and slender; the post-petiole becomes gradually wider from the base to the apex; the second and third segments are closely aciculated; the others smooth; the apical three segments become gradually narrowed; the last is largely developed; the cerci are prominent; the ovipositor largely projects; the ventral keel is large, and extends to the apex of the fifth segment.

The species of this genus known to me are uniformly ferruginous, with the wings hyaline, or yellowish-hyaline, at the most only slightly smoky at the apex; the antennæ are similarly coloured, darker towards the apex and lighter in the middle. The median segment is more regularly and completely areolated than usual; the sides of the abdominal segments do not project laterally. In the male the antennæ are not distinctly serrate.

A distinct genus, easily known by the flat face, the completely areolated median segment, with its stout spines; the pyramidal scutellum, deeply depressed on the top; and the abdomen narrowed at the apex, and with a long projecting ovipositor. In the arrangement of Kriechbaumer and Ashmead, the genus would come in near *Cryptojoppa*.

ACANTHOJOPPA SCHIZOASPIS, sp. nov.

Ferruginea, facie, clypeo, pleurisique flavis; antennis ferrugineis, apice late nigris; alis fulvo-fumatis, stigmatè ferrugineo. ♀.

Long. 15-16 mm.

Hab. Khasia (coll. Rothney).

Antennæ rufo-fulvous, beyond the sixteenth joint black; the scape punctured, thickly covered with short black hair; the flagellum with a pale down. Head rufo-fulvous; the face and clypeus with a paler yellowish tinge; closely and rather strongly punctured; the apex of the clypeus impunctate in the middle; the labrum closely punctured; thickly covered with long fulvous hair. The apex of the mandibles broadly black. Front very smooth and shining; the vertex shagreened; the orbits yellow. The mesonotum dark rufous; closely punctured, thickly covered with short black hair. Scutellum large, pyramidal; the base with an oblique slope; the apex almost perpendicular; the top roundly and deeply depressed; the sides somewhat triangular, rounded; margined; the basal keels large, curved, acute; the basal depression narrow, transverse, not very deep; the hair thick, long, blackish. Post-scutellum yellowish, with an obliquely rounded slope;

the centre closely and finely striated; the sides with a few stout striations; the depressions at its sides wide, shallow, and marked with stout keels; the base of the median segment in the centre has a rounded slope, deeply depressed in the middle, and bordered with a stout keel round the sides and apex; the apex is rugose. The supra-median area is slightly wider than long; the base almost transverse; the sides at the base oblique; at the apex more sharply oblique; the apex bulges roundly inwardly; the posterior median area is of almost equal width throughout; the teeth are large, broad; the base of the segment is strongly punctured; the supramedian area has a few oblique striations; the apex strongly transversely striated. The upper part of the propleuræ is strongly punctured; the centre at the base with a few fine oblique striations; the lower part at the middle and apex with stout, irregular, mostly curved, keels. Mesopleuræ strongly punctured; the middle with some stout longitudinal striations; the tubercles large, elongate, leaf-like, roundly narrowed at the base and apex. The base of the metapleuræ above finely, the rest coarsely, punctured, the punctures running into reticulations; in front of the hinder coxæ are some stout oblique striations, and in front of these is a stout curved keel. Mesosternum thickly covered with fuscous hair, punctured; the furrows deep, much widened at the apex. Legs stout; the four anterior coxæ and trochanters more or less yellowish; the hinder strongly punctured; the hinder tarsi spinose. The costa and stigma are luteous; the nervures darker; the areolet narrowed at the top, the transverse cubital nervures almost uniting there; the first is largely bullated at the top; the second in the centre; the recurrent nervure is received in the centre of the areolet; the transverse median nervure is received distinctly in front of the transverse median. Petiole yellowish at the base, the apex shagreened; the sides at the apex with some large deep punctures. The other segments are closely punctured; blackish down the middle; the gastrocelli shallow, closely punctured; the space between them striated. The sheaths of the ovipositor fulvous, densely haired; the apex black.

(To be continued.)

SOUTH AFRICAN COCCIDÆ.—II.

By T. D. A. COCKERELL.

Aspidiotus (Marganella) maskelli, Ckll.

Botanical Gardens, Durban, Natal; on twigs of *Camellia* (*Fuller*). New to the African continent; it has been found in Mauritius by De Charmoy.

Hemichionaspis cyanogena, Ckll.

Verulam, Natal (*Fuller*). Botanical Gardens, Durban, Natal; on *Alternaria* (*Fuller*). The last-mentioned material showed circumgenital glands as follows: median, 17; cephalolateral, 16; caudolateral, 13. The type had median, 11; cephalolateral, 17; caudolateral, 15.

Chionaspis exalbida, n. sp.

♀. Scales crowded, about $1\frac{2}{3}$ mm. long, convex, very narrow, pure white, with yellow-brown exuviae; the second skin has the basal half covered with white secretion, but the apical half is bare and clear brownish yellow.

♀. Deep carmine-red (turns green on boiling in caustic potash), elongate, the margins of the segments nowhere projecting. Caudal end scarcely chitinised; no circumgenital glands; the usual rows of transverse dorsal glands, but they are irregular, with few glands; margin of caudal end with many lobules, which hardly take the form of definite lobes; the median lobules are rounded, and separated by a rather wide interval, and present a projecting point at their outer edge; after these come two rounded prominences, then two rounded depressions, separated by a prominence which is sometimes bifid; then comes a little projection, and then a large gently convex portion, then a notch, and after that a few notches at rather distant intervals. There are apparently no squames, but specimens which have not been treated with potash show a short waxy fringe taking the place of squames.

♂. Scales of the usual *Chionaspis* form, but texture quite dense; unicarinat, some faintly tricarinate.

On leaves of aloe, Howick, Natal (*Fuller*). This is not a true *Chionaspis*, but there is no other genus to receive it.

Poliaspis carissæ, n. sp.

♀. Scale similar to that of *P. cycadis*, but perhaps narrower; second skin pale, as in *cycadis*.

♀. Similar to *P. cycadis*, but the strongly serrulate reddish-brown median lobes are wide apart, the interval being nearly as great as the breadth of a lobe; the second lobe consists of two lobules, of which the inner is the larger, and its tip projects a little beyond the level of the tips of the median lobes; the margin just beyond the second lobe bears two large oval dorsal glands, like those of the series on the next segments anteriorly; there are only four dorsal glands in the short rows nearest the anal orifice. The middle of the body is red-brown, and strongly chitinised. Circumgenital glands in eight groups; the posterior laterals 19, middle laterals (cephalolaterals of other genera), 11, median 5, in a transverse row, and the anterior groups characteristic of *Poliaspis* form a transverse series broken into three linear groups of three or four, which are widely separated.

♂. Scale tricarinate.

On *Carissa* (? *C. grandiflora*, DC.), a plant which belongs to the Apocynaceæ. Durban, Natal (*Fuller*). In this species and *P. cycadis* the anterior groups of glands are in transverse lines; in *P. media*, and the species described by Fuller from Australia, the groups are circular.

Halimococcus lampas, Ckll.

Mr. Fuller sends new material on the palm, *Hyphæne crinita*, Gaertn. This palm is a native of Natal.

Dactylopius filamentosus, Ckll.

Mr. Fuller sends a large variety of this species on orange, and says it is more common upon a native *Dombeya*. The antennæ measure as follows in μ , joints: (1.) 30, (2.) 42, (3.) 30-36, (4.) 39-45, (5.) 24-30, (6.) 33, (7.) 75-78.

Ceroplastes candela, Ckll. & King, n. sp.

♀. Long. $2\frac{3}{4}$, lat. $3\frac{1}{2}$, alt. $4\frac{1}{2}$ mm.; dark red-brown, elevated, with vertical sides. Caudal horn a prominent stout spine, hardly $\frac{1}{2}$ mm. long, placed nearer the top of the scale than the base. Dorsum smooth and shining, with only a very small central raised line. Sides of insects with vertical stripes of dense white secretion; no wax, except that composing these stripes, between the insects, which are densely crowded together, their vertical sides contiguous. They rest on a thin substratum of wax, and are covered above with yellowish-white wax, about 1 mm. thick. The outlines of the insects are vaguely marked on the surface of the covering wax by a brownish stain. The wax, with the insects beneath, surrounds the twigs as the wax does the wick of a candle; the whole mass is about 20 mm. diameter, that of the twig being about 5 mm.

Mr. King found the antennæ to measure thus in μ :—

Joints :	(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)
Length :	56.	68.	56.	60.	28.	32.	40.
Breadth :	64.	48.	40.	32.	28.	28.	24.

Found by Mr. Fuller at Richmond, Natal. The nearest ally is an undescribed species from Paraguay, collected by Professor Bruner.

Ceroplastes egbarum, Ckll., subsp. *fulleri*, T. D. A. & W. P. Ckll., n. subsp.

♀. Waxy scale hemispherical, long. $15\frac{1}{2}$, lat. 12, alt. 10 mm.; in dry specimens rough, pale reddish, not divided into plates. ♀. Denuded of wax hemispherical, very dark red-brown, long. $8\frac{1}{2}$, lat. 8, alt. 8 mm.; sides infolded beneath, so that the inferior aperture is considerably smaller than the diameter of the scale. Anterior end narrowed and elevated, having the form of the end of a pig's snout. Caudal horn distinct, but very short, about $\frac{1}{2}$ mm. long; a very deep sulcus runs from below the caudal horn to the margin. Middle of back with a prominence about as high as the caudal horn, but larger, because lengthened posteriorly, having a keel-like form.

In caustic potash the female gives a deep madder-red colour; this colour is obliterated, leaving only a faint greenish tint, by the addition of acetic or nitric acid. On adding more potash, so as to neutralise the acid, the red colour is restored. The wax is not altered in colour by chloroform.

Skin with several large (about 800 μ diam.) strongly chitinous red-brown patches, thickly perforated with small gland-pores, recalling the nozzle of a garden sprinkler. Legs ordinary, except that the femur is very stout; measurements in μ : femur with trochanter, 192 (width of femur 95); tibia, 160; tarsus, 81; claw, 27. Tarsal digitules about 60 μ long, very fine hairs, with rather large round knobs. Claw-digitules stout, about 36 μ long, with large dark brown knobs.

Sent by Mr. Fuller, labelled: "Large red *Ceroplastes*, on *Acacia* and *Mimosa*, coast of Natal." This is probably a valid species; Mr. Fuller seems to consider it different from the ordinary white species, *C. egbarum* (*cristatus*, Green). Some time ago Dr. Strachan sent me from Lagos a very large *C. egbarum*—waxy scale, long. 20, lat. 13, alt. 10 mm.—with the dorsal area of the wax slightly pinkish. This seems to be another distinct variety or subspecies, but the material was not sufficient for satisfactory description.

Mr. Fuller writes that it is from the species of *Ceroplastes* that the Kaffirs make their head-rings. The large white species on *Mimosa*—I suppose *C. egbarum*—is the one most commonly used, as it is very plentiful. Mr. Fuller thus describes the process:—"The head-rings are made from a mixture—half and half, I am told—of calcined coccids and fresh material. Of course, no effort is made to extract the insects, a fact which accounts no doubt for the intense blackness of the rings."

East Las Vegas, New Mexico, U.S.A.

Jan. 14th, 1902.

NOTES AND OBSERVATIONS.

THE NOMENCLATURE OF THE COCCIDÆ.—In the course of revising the genera of Coccidæ, I have found the following new names and changes of name apparently necessary:—

(1.) *Ultracelostoma*, new subgenus of *Celostomidia*; female adult without mouth or legs; antennæ more or less rudimentary. Type *Celostomidia assimilis* (*Celostoma assimile*, Maskell), from New Zealand.

(2.) *Arctorthesia*, new section of *Orthezia*; female with waxy secretion dense, not easily removed; wedge-shaped lamellæ in dorsal line. Boreal forms. (*O. occidentalis* and *O. cataphracta*.)

(3.) *Bambusaspis* new section of *Asterolecanium*; scale elongated, often very narrow; living on bamboos and palms in the Tropics. Includes *A. miliaris*, *A. bambusæ*, *A. delicatum*, *A. solenophoroides*, *A. palmæ*, *A. urichi*.

(4.) *Phenacobryum*, new section of *Asterolecanium*; scale with laminae resembling moss-leaves. *A. bryoides* (Maskell) and *A. stellatum* (Maskell, as *bryoides* var.).

(5.) *Ascelis*, Schrader; n. syn. *Cystococcus*, Fuller, Tr. Ent. Soc. Lond. 1899, p. 462. (*A. echiniformis* (*Cystococcus echiniformis*, Fuller)). T. D. A. COCKERELL; E. Las Vegas, New Mexico, U.S.A.; Feb. 2nd, 1902.

NOTE ON LARVÆ OF CHRYSOPHANUS PHLŒAS.—I obtained a large number of *C. phlœas* ova last October, from captured females. The larvæ duly hatched out, and have lived through the winter in a conservatory, but not heated, except by means of a lamp, just enough to keep the frost from plants. Some of them appear to have fed all through the winter and are now full grown, while others are smaller.

Those found in the open to-day by my son were all very small.—E. SABINE; The Villas, Erith, March 13th, 1902.

CATALOGUE OF THE LEPIDOPTERA OF IRELAND. — There are three points I am sorry not to see touched upon in the review of this Catalogue (*ante*, p. 54). First, why *Cænonympha typhon* occurs further south in Ireland than in England, *i.e.* why it should occur in the Killarney district and not in the wilds of Dartmoor and Exmoor, in Devonshire. Second, the occurrence of *Bankia argentula* both in the English fen counties and in the west of Ireland, but not in the intervening space. Third, why should our islands have been restocked from the Continent since the climax of the Glacial Period? One question is, how long might the ova and pupæ of insects remain buried in the earth or in rubbish, beneath snow and ice? If they can do so for years, what occasion was there for our islands to be restocked? Another is, was not the greater part of Europe overwhelmed, as much as our own islands? What prevents our islands from being part of the Arctic Regions but the changeability of the winds? Should the wind blow uninterruptedly from the north-east for twelve months or more, we shall again have a glacial period.—C. W. DALE; Feb. 8th, 1902.

CAPTURES AND FIELD REPORTS.

COLIAS HYALE NEAR DARTFORD IN 1902.—While out collecting larvæ this morning, one of my sons saw a male of this species disporting itself on the railway bank. It passed close by him several times, apparently in good condition, its colour being very bright. I should fancy this is a “record” early appearance. Are we to have a third *hyale* year in succession?—E. SABINE; Erith, March 13th, 1902.

THECLA W-ALBUM AND COLIAS EDUSA IN BRISTOL DISTRICT.—It might interest some readers to know that *T. w-album* was very common last year in certain favoured spots at Bristol, while in the season of 1900 it positively swarmed. In the latter year *C. edusa* was very abundant in Leigh woods and neighbourhood.—M. J. L. DAVIS; Lyndhurst, St. Ronnan’s Avenue, Redland, Bristol.

YORKSHIRE DRAGONFLIES.—Mr. H. J. Burkill sends the following notes on Yorkshire dragonflies:—“In the ‘Entomologist’ for February last *Cordulegaster annulatus* is reported for 1901, from Yorkshire. I saw two insects of this species on Aug. 15th, 1901, in Hayburn Wyke, a wooded ravine on the coast, six miles north of Scarborough. Being unprovided with a net, I could do no more than stalk them slowly, and on one occasion stood for nearly ten minutes within five yards of one of the pair which was sunning itself on an ash-trunk. I think there is no doubt as to the identity of the species, the alternate yellow and dark bands being so very conspicuous. A few miles further north, on Sept. 4th, 1899, I captured several specimens of *Sympetrum scoticum* on the moors. This last year, in June, I found *Libellula depressa* very abundant on the cliffs south of Scarborough, together with *Ischnura elegans* and a few *Agrion puella*. I might add that I picked up a dead male *Calopteryx virgo*, in the road

near Hackness, in August, 1897 or 1898. The insect had been run over in the dust, but was almost perfect nevertheless."—W. J. LUCAS.

ESSEX DRAGONFLIES.—As no records for dragonflies at Romford exist, it cannot be out of place to mention that Rev. W. Claxton took the two common species, *Libellula depressa*, male (May 22nd), and *Agrion puella*, female (June 8th), in his garden at Navestock Vicarage, in 1901.—W. J. LUCAS.

LEPIDOPTERA HETEROCERA OF PARIS.—The following is a list of Lepidoptera Heterocera obtained in the suburbs and environs of Paris in June and July, 1901:—*Smerinthus tilia*, Rue des Dames Augustins; one specimen freshly emerged. *Sphinx ligustri*, two specimens obtained from the lads of the racing stables, Maison Lafitte. *Macroglossa stellatarum*, Courbevoie, Forest of St. Germain, Parc Maison Lafitte; here, as elsewhere, on viper's bugloss. *Saturnia pavonia major*, one specimen (given me at Hôtel de la Gare, Fontainebleau). *Lasiocampa rubi*, ditto. *Odonestis potatoria*, two specimens obtained from the lads of the racing stables, Maison Lafitte. *Euchelia jacobæ*, one specimen taken, Parc Maison Lafitte. *Liparis salicis*, *L. auriflua*, and *L. chrysorrhæa*, one specimen, Boulevard Bineau, Neuilly. *Arctia villica*, one specimen, Chantilly. *Plusia gamma*, a few seen, lucerne field, Courbevoie. *Venilia maculata*, two captured, Forest of Fontainebleau. *Camptogramma bilineata*, common, Parc Maison Lafitte and Forest of St. Germain. In September, 1901:—*Macroglossa stellatarum*, seen, Courbevoie. *Saturnia pavonia major*, seven specimens obtained from the tram conductor, Port Marly. *Smerinthus populi*, *Sphinx ligustri*, and *Acherontia atropos*, all in possession of tram conductor, but in indifferent condition, Port Marly. — (Rev.) F. A. WALKER; Dun Mallard, Cricklewood.

NOTES FROM THE CHESTER DISTRICT.—On July 19th I took a larva of *Notodonta dictæa*, and one of *Acronycta alni*, off some red willows near Shotwick. The first-mentioned emerged as a perfect insect on August 18th—a representative of a second brood. The larva of *A. alni* spun up on August 5th. On August 26th a friend sent me a full-grown larva of *Cossus ligniperda* in an ordinary chip match-box. Fortunately it arrived safely, but it had so enveloped itself in a cocoon that I left it as it was. About a month afterwards it bit its way out into the cage, and then surrounded itself with another web. This, I expect, from previous experience, to be its last performance before appearing as a moth in June. Larvæ of *Smerinthus ocellatus* were common, here and there, on willows and sallows. From a single bush near Saughall a friend and I gathered over a dozen on August 24th; but it was the only favoured shrub among six or eight. From sedges by a pond side I got four pupæ of *Plusia festuæ* in their long cocoons of white silk on August 31st. The moths emerged between Sept. 2nd and Sept. 13th, and I am inclined to look upon them as a third brood (see Entom. xxxiv. 257). In a particular spot of Delamere Forest, where branches of the Scotch firs are well within reach, I went to beat for larvæ of *Macaria liturata* on Sept. 13th. The sooty melanic form occurs with the type, and has been given the varietal name *nigrofulvata* by Mr. J. Collins, of Warrington (Entom. xxxiv. 364). Thunberg's name for the species was *M. fuscata*, and this sets one

wondering if his type was our varietal form. I got three species of larvæ, and all very much like each other—*M. liturata*, *Bupalus piniaria*, and *Thera variata*. Skipping minor points of difference, all were green, all about the same shape and size, and all were striped with either white or yellowish-white; but the red-brown head, legs, and claspers easily marked out *M. liturata*, while the white dorsal line of *B. piniaria* separated the latter from *T. variata*. Some imagines of *T. variata* appeared in October; possibly others are lying over till next June. But I was a week or more too late, and I did not get many of either species. The August brood of *Pararge megæra* showed up numerously in the neighbourhoods of Saughall and Shotwick. The under sides of this butterfly, with their delicate dark pencillings on a grey ground, their marginal crescents and target-like discs (I am referring to the secondaries), deserve more attention than perhaps they receive. Among "varieties" I have little more to add. I reared two or three dozen *Odonestis potatoria*, and I believe the following description holds generally good as far as the spots on the upper wings are concerned: "A white central spot, and a small white spot between it and the costa." One of my males is without this small white spot. On Oct. 12th I went to Delamere Forest with a friend who is great on fungi. These ephemeral things were the objects of his visit, mine were as many imagines of *Oporabia autumnata* as I could take. Fungi there were in profusion. Two species of the "fairy-rings" grew in the fields—the tasty champignon and the equally common "puff-balls." In the woodlands there were fungi scarlet, fungi violet, fungi white, and fungi chocolate. Broadly speaking, Nature marks the poisonous species in brilliant colours, like so many danger signals. On the birch trunks, no longer hidden by denser foliage, grew the fungus peculiar to these trees, *Polyporus betulinus*. This, when dried, forms a capital substitute for cork. It is pure white when dried and cut up, and the first entomological cabinet I ever saw was lined with strips of this fungus. By beating the birches I sent on the wing three geometers, which, from their silvery whiteness, may have been *autumnata*, but I failed to net them. And I was obliged to give the birches up, for they were so charged, in the early morning, with the rain-drops of the previous night, that beating the branches was like standing in a shower-bath. My friend left by a mid-day train, and I went to lunch at the 'Abbey Arms,' and then to dessert in the forest off luscious blackberries, which nobody seems to gather in these days of factory-made jams and "substitutes." But this led me among the oaks, and as everything was now dry, I beat them for all I was worth, as I had accidentally started two or three *Oporabias* from them. I got about two dozen altogether, including nice banded forms and paler specimens. But, thanks to the kind assistance of Mr. L. B. Prout, they all turned out to be *O. dilutata*. The moral of this story, I should say, is keep away from oaks if you want *autumnata*, and stick to alder and birch (Entom. xxxiv. 43). At the electric lamps the luck continued, on the whole, deficient in quantity, although very fair in quality. On August 20th I took a moth new to the district, *Asphalia diluta*. Unfortunately it had been trodden upon as it rested on the pavement below the lamp. In September, *Anchocelis lunosa* was unusually plentiful, including pale

and dark forms. During the latter half of the month *A. pistacina* appeared. This moth exhibited varieties leading from the type to the unicolorous and nearly spotless bright-chestnut form. On the other hand, an intermediate pattern was so spotted as to strikingly remind one of *Dasygampa rubiginea*. A few *Epunda lutulenta*, all nearly black, were also taken during the month. My best capture, however, was on the 9th, a very fair specimen of *Heliothis armigera*. It is undoubtedly of British nationality, straw-coloured, instead of the dark form I always rear, say a month earlier, from larvæ found in foreign tomatoes. According to Mr. Walker's list, this is the second capture of the species in the district. *P. festuæ* occurred again at the lamps, Sept. 9th, fresh from the chrysalis; and on the 21st one *Agrotis saucia*. A grand male *Dasytopia templi* turned up on Oct. 10th. Winter weather set in on Nov. 13th, with alternate rain, snow, and frost up to the 26th, when mild weather prevailed and brought out *Pacilocampa populi*. Some individual examples of certain species occurred on such extraordinary dates that they suggest second broods; they were as follows:—*Hepialus humuli*, a small but fresh female, August 24th; *Spilosoma menthastri*, Sept. 2nd; *Porthesia similis*=*auriflua*, Sept. 8th. J. ARKLE; Chester.

NOTES FROM DORKING FOR THE SEASON OF 1901.—Of the four seasons that I have lived in this neighbourhood, the one just past has been far and away the best. I have worked hardest, like most of those who are, comparatively speaking, beginners in entomology, among the Diurni, intending to pay more attention to the Nocturni when the former are more complete. I will go through in order the forty-one species which I have taken here. Of course *Pieris brassicæ*, *rapæ*, and *napi* were in profusion, the first-named perhaps less so than is the case sometimes. *Euchloë cardamines* I took in plenty, especially males, from May 7th till May 23rd. *Colias edusa* was far from being so common as last year, only one specimen coming in my way, and that I did not take. *C. hyale* was seen on August 7th, and again on the 12th, when I got a male in good condition. *Gonepteryx rhamni*, for some reason or other, was far from common in the later summer, though the hibernated specimens were very plentiful from April 1st till the beginning of May. Among the Nymphalidæ I was very successful, for besides breeding a fine series of *Argynnis paphia*, I took *A. aglaia* and *A. adippe* in splendid condition from the beginning of July till about the middle of that month. *A. selene* and *A. euphrosyne* were also plentiful enough about the end of May. My *A. paphia* larvæ began to pupate on May 24th, and went on doing so till June 9th. The first imago appeared on June 10th, and the last on June 25th. Among the Vanessas, the larvæ of *V. urticae* were swarming during May and the first week in June, the first pupa appearing on June 4th, and the first imago on June 17th. *V. polychloros* occurred in greater numbers than I have previously experienced. The hibernated specimens were quite common during the first fortnight of April; the larvæ emerged from ova on May 13th and 14th, and pupated from June 10th to the 14th. The imagines came out from June 29th till July 2nd. I regard the profusion of this insect to be one of the events of the year. But the other members of the genus were con-

spicuous by their absence. I saw two hybernated specimens of *V. io* on April 19th, but not a single *V. atalanta* or *V. cardui*, though I heard of *V. atalanta* being seen. Of course *Epinephele ianira* and *E. tithonus* were in profusion, and *Satyrus* (*H.*) *semele* was to be obtained in some numbers about the end of July. *Aphantopus* (*H.*) *hyperanthus* was as common as *E. ianira* about the third week in July; and *Cænonympha pamphilus* was as usual too abundant to be pleasant. *Pararge* (*S.*) *megæra* was common in August, and *P. egerides* was to be taken in the middle of May, and again in the middle of August. Many of the Lycenidæ were in the utmost profusion, notably *Thecla rubi*, from May 12th till June 6th; *Lycæna icarus*, of course more than once; *L. adonis* during the latter half of May and again towards the end of August; *L. corydon* from July 20th to August 3rd; *L. argiolus* from May 1st to the 23rd, and again at the end of July; and *Chrysophanus phlæas* in the middle of May, in the middle of July, and again in the middle of August, one being seen as late as September the 29th. All the above Lycenidæ were very abundant, but others occurred also. Though I have not yet succeeded in finding either *Thecla w-album* or *T. quercus* here, a friend sent me some pupæ of both these species, and I have got a fine series of each. *L. ægon* must abound somewhere here, but I have hitherto only found one or two specimens at a time, and it has been the same with *L. agestis*. *L. minima* (*alsus*) was quite plentiful towards the end of June and up to the middle of July, but was not in such numbers as *corydon*, *adonis*, *icarus*, or *argiolus*. An enthusiastic entomologist called on me one day (July 15th), and, in return for the meagre information I could give him as to this locality, he most generously gave me two fine specimens of *L. arion*, caught during the previous week in Cornwall. The second event of the season for me has been the successful rearing of *Nemeobius lucina* to the pupal stage. This insect is found near here in some numbers, and from May 15th to the 29th I took a fair quantity, being fortunate enough to secure a male and female in *coitu*. I placed the female in a cylinder with a primrose-root, and got a large batch of ova. The larvæ appeared on June 4th, and began to pupate on July 8th. I wondered whether the imagines would emerge this year, seeing that the pupæ were somewhat early; but none of those I kept have done so, nor can I hear of the emergence of any that I sent away to friends. Of the Hesperidæ, I have taken five:—*Thanaos tages* and *Syrichthus malvæ* in May and the early part of June; *Hesperia sylvanus* in June and July; *H. thaumas* and *H. comma* in July. The very interesting article in this month's 'Entomologist' (xxxiv. 325–328) on the "Life-history of *H. comma*," has led me to hope that I may breed some next year.

So much for the Diurni, to which, as I said before, I have paid most attention, though I feel sure I have not yet exhausted the species to be found in our neighbourhood. *T. quercus* and probably *T. w-album* occur somewhere in the district, and *Melanargia galatea* must be about also; in fact, I have been told of its capture, though I could not ascertain the precise locality.

What I have done among the Nocturni has been chiefly breeding from ova or larvæ sent me by friends. I tried sugaring to a limited extent in August, but, like your correspondent, Mr. A. J. Lawrence, of

Bromley (*vide* Entom. xxxiv. p. 354), I met with no success at all. Woodlice and earwigs appeared in plenty, but not a single moth. Curiously enough, a young friend of mine who was sugaring on the same nights about half a mile away was fairly successful; the chief results he obtained being *A. pyramidea*, *T. fimbria*, and others of the same genus. I did very little net-work, but by means of light, or duskings, or by beating in the daytime, I took the following:—*S. ligustri*, *M. stellatarum*, *H. bombyliiformis*, *Z. filipendulæ*, *E. jacobææ*, *P. bucephala*, *C. graminis*, *T. orbona*, *T. comes*, *T. pronuba*, *M. maura*, *P. moneta*, *E. mi*, *E. glyphica*, *C. nupta*, *U. sambucaria*, *R. luteolata*, *V. macularia*, *M. margaritaria*, *C. elinguaris*, *E. alniaria*, *G. vernaria*, *A. grossulariata*, and *E. cerrinata*.

As to breeding, I have mentioned in former notes (*vide* Entom. xxxiv. pp. 229 and 258) how that several Sphingidæ, *S. ligustri*, *S. ocellatus*, *S. populi*, and *S. tiliæ*, were much earlier this year than usual, and how I got a double brood of *S. ocellatus* and *S. populi*. I expected the same to occur with *S. tiliæ*, but it did not. I experienced a complete failure with some larvæ of *Hyloicus* (*S.*) *pinastri*, which died off after the fourth moult. A batch of about a dozen *C. elpenor* fed up successfully on vine, and began pupating on August 11th, but several died in the attempt, and I am left with seven healthy pupæ. Larvæ of *E. jacobææ* were very plentiful on ragwort during the latter part of July; and on May 29th I found two fine larvæ of *A. caia*, which, however, refused to feed in confinement, and died before reaching the pupal stage. A batch of ova of *Z. æsculi*, which were given me, yielded larvæ on July 23rd, which are at present feeding inside a piece of apple-wood, as are also four larvæ of *C. ligniperda*. I was very successful with *Lymantria* (*O.*) *monacha*, which fed up on apple. The larvæ emerged on April 19th and 20th, pupated during the early part of June, and imagines began to appear on June 26th. Out of fifteen larvæ of *Malacosoma* (*B.*) *neustria*, also fed on apple, and which began to pupate on June 23rd, only four imagines resulted, the first appearing on July 11th. This autumn I have taken a number of larvæ of *Macrothylacia* (*B.*) *rubi*, which continued to feed on bramble up to the beginning of November, when they retired for the winter. A dozen larvæ of *Lasiocampa* (*B.*) *quercus* were sent me on April 30th. They were fed on poplar, and the first four spun up on May 16th or 17th. A male appeared on July 11th, two females on July 12th, and one female on July 19th. But the remaining eight went on feeding slowly till the first week in August, and are hibernating as pupæ. A brood of *E. versicolor* came out on April 21st, and were full fed by the first week in June; and a batch of *S. carpini*, which emerged on May 30th, fed up on willow till July 7th to 10th. Frequently on a hot day I have noticed the pupæ of this insect wriggling about inside the cocoon, the result being a harsh grating noise. I had a very late brood of *Pheosia* (*N.*) *dictæa* sent me from Bexley, the last of which did not cease feeding till Nov. 1st. During the previous week or ten days I had experienced considerable difficulty in getting fresh poplar leaves for them. I had a batch of ova of *C. fraxini* sent me from abroad, and from these (larvæ emerged April 27th till May 9th, pupated June 17th and next ten days) I got, from July 20th to August 4th, a fine series of imagines. They are very fine insects, and I experienced

no difficulty with them, for they fed quite readily on poplar. Why, then, do they not breed freely in England? Simultaneously with these I was breeding *C. nupta* and *C. sponsa*. The conditions were precisely similar in all three cases. *Sponsa* emerged from ova on April 23rd, 24th, and 25th, pupated May 28th to June 2nd, imagines appeared July 1st to 6th. *Nupta* larvæ came out April 27th till May 9th, spun up during the first week in June, and arrived at maturity July 7th to 17th. They are all very fine insects, and their breeding afforded me much pleasure. I brought through a summer brood of *S. illustraria*, which fed on birch from May 20th till June 11th. They grew very rapidly, and produced fine imagines from June 29th to July 4th. This struck me as being very quick work—*i.e.* forty days from ovum to imago, under natural conditions. I got some ova from a female, and hoped to rear a second brood, but unfortunately they all proved to be unfertile. A batch of *E. fuscantaria*, fed on ash from May 19th to June 21st, produced a good series, which emerged at intervals between July 22nd and August 17th. A very fine female of *A. betularia* var. *doubledayaria* was sent me from Yorkshire, together with a number of ova she had laid. Swarms of larvæ appeared on July 5th and 6th. They fed up successfully on lime, and pupated between August 20th and 26th, with the exception of one, which went on feeding till September 21st. Four *Euonymus* bushes in my garden were, as last year, swarming with larvæ of *A. grossulariata*; but though I examined about a hundred of the resultant imagines, I failed to find any that were not typical.

The above represents the bulk of my work during the season of 1901, which I think I may fairly call a very satisfactory one.—F. A. OLDAKER; Parsonage House, Dorking, Dec. 7th, 1901.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*March 5th, 1902.*—The Rev. Canon Fowler, M.A., F.L.S., President, in the chair.—Dr. B. Douglas Macdonald, M.D., of Malsette, Rhodesia, S. Africa; and Mr. Arthur M. Montgomery, of the Grove, Ealing, W., were elected Fellows of the Society.—Mr. L. B. Prout exhibited, on behalf of Mr. J. P. Mutch, of Hornsey Road, London, N.:—(a) *Vanessa (Eugonia) polychloros*, L., a female bred by Mr. H. Baker from pupa from Stowmarket, Suffolk, the ground colour much darkened and the black markings somewhat enlarged, &c.; suggesting perhaps the influence of cold at time of pupation (compare Tr. Ent. Soc. 1894, p. 431, &c.). (b) *Chrysophanus phlœas*, L., an aberration (captured in the Isle of Wight, August, 1901) much suffused with the dark colour, especially at outer margin and on hind wings, only a very small patch of the red colour remaining at the inner angle of the latter. (c) *Agrotis puta*, Hb., a perfectly halved gynandromorphous example, the right side male, the left side female, taken in August, 1901, in the Isle of Wight. (d) *Noctua sobrina*, Gn., an aberrant specimen with white antennæ and a somewhat hoary appearance on the fore wings, taken in East Aberdeenshire, August, 1900.—Mr. A. Bacot exhibited a series of *Malacosoma castrensis* and a

series of *M. neustria* for comparison with a hybrid brood, resulting from a pairing between a male *neustria* and a female *castrensis*. Only a portion of the batch of from two hundred to three hundred ova that the female laid hatched. The last of the females that eventually emerged was three weeks ahead of the first male, and most unfortunately before any males of either of the parent species, so that the fertility of the hybrid females could not be tested. Their bodies apparently contain few, if any, ova. Mr. Bacot said he had every reason to believe, however, that he obtained pairings between the hybrid males and females of *castrensis*, in addition to fresh pairings between males of *neustria* and females of *castrensis*, and therefore had hopes of continuing the experiment next summer. Mr. J. W. Tutt said this was the first time any exhibition of experiments of the kind had been made before the Society by British investigators, though Mr. Merrifield had shown a number of crosses bred by Dr. Standfuss. In this case the colouring of the female hybrids, departing from the usual colour of the females of the parent species, appeared to approach more nearly in tint the females of the closely-allied Alpine species *M. alpicola*, and it would be interesting to discover whether the peculiarity of colour in the hybrid females really marked a tendency to revert to a more primitive type of coloration, such, for example, as that exhibited by *M. alpicola*. The sexes, as exhibited, were very clearly distinguishable, and there was not much tendency to gynandromorphism, though of sixty or seventy specimens almost every female showed some signs of male coloration.—Mr. O. E. Janson exhibited a pair of *Stephanocrates dohertyi*, Jord., a goliath beetle discovered by the late W. Doherty in the highlands of British East Africa.—Dr. T. A. Chapman exhibited cocoons of a Limacodid moth from La Plata, with empty pupa-cases of a dipterous parasite of the genus *Systropus*, obtained from Herr Heyne, who unfortunately had no imagines either of the moth or the fly. There is a close resemblance between the two pupa-cases, as seen by comparison with genuine Limacodid cases. The resemblance is, however, not merely of appearance, but functional also. The moth pupa, *i.e.* the moth itself inside the pupa-case, almost certainly by inflating itself with air, to secure greater size and a stiffened epiderm as a basis of muscular action, exerts an end-to-end pressure within the cocoon, and so forces off a lid. It is here that the beak or “cocoon-opener,” with which the pupa is armed, is useful as determining that the fracture shall be at the right end, making the lid split off here, under much less pressure than would be efficient without it, and leaving no chance for fracture to occur at the wrong end when pressure is equally distributed. The *Systropus* breaks off a similar lid, no doubt by similar end-to-end pressure to that exerted by the moth, *Diptera* having highly developed the habit of inflating themselves with air, at emergence from the pupa. This pupa also has a beak very like that of the Limacodid, but even stronger and sharper.—Dr. Chapman also showed a Bombyliid pupa-case from West Africa, very like that of some British forms, the head-armature of which is not a “cocoon-opener,” but an excavating or navvying machine, for use in burrowing a way out of loose soil, such as that in which solitary bees’ nests are found. The pupa of an African species of practically the same habits as this South American

one is described and figured in Prof. Westwood's Monograph of the genus *Systropus* in the 'Transactions' for 1876.—Mr. J. E. Collin, in further illustration of Dr. Chapman's remarks, exhibited specimens of:—(a) *Systropus* sp.?, from Buenos Ayres, parasitic on a Bombyliid Lepidopteron (*Limacoles*?). This he said was possibly the same as Dr. Chapman would have reared from his cocoons. The species was apparently undescribed, but most allied to *S. brasiliensis*, Meg. As Prof. Westwood noticed in 1876, the insect is very slender to inhabit so stout a pupa-case. (b) *Systropus* sp.?, a large handsome undescribed species from Bigot's collection.—Professor Poulton, F.R.S., introduced a paper by Mr. Guy A. K. Marshall, entitled, "Five years' (1897–1901) observations and experiments in the bionomics of South African insects, dealing especially with warning colours and mimicry, with appendices containing descriptions of new species by Col. C. T. Bingham and W. L. Distant." The paper was illustrated by many photographs projected on the screen showing the groups of South African insects of many orders collected by Mr. Marshall, each with a common type of warning coloration. Some of these groups included mimetic species of great interest. An important section of the paper contained the description of a long series of careful experiments conducted upon the chief vertebrate and invertebrate insect enemies of South Africa. The number of new facts is so large; the experiments so numerous and complete; and the range of observation extended over so many Orders, in addition to the much-studied Lepidoptera, that this memoir places South Africa in the first rank as the country from which the chief evidence in support of existing theories of mimicry, warning colours, &c., has been supplied. A discussion ensued, in which Mr. F. Merrifield, Dr. F. A. Dixey, Prof. Hudson Beare, Colonel Yerbury, Mr. J. W. Tutt, and Prof. Poulton took part.—Mr. Malcolm Burr, B.A., F.L.S., contributed "A monograph of the genus *Acrida*, with notes of some allied genera, and descriptions of new species," and Dr. D. Sharp, F.R.S., communicated three papers by Mr. R. C. L. Perkins, respectively entitled:—(a) "Notes on Hawaiian wasps, with descriptions of new species"; (b) "Four new species and a new genus of parasitic Hymenoptera (Ichneumonidæ) from the Hawaiian Islands"; and (c) "On the generic characters of Hawaiian Crabronidæ; four new genera characterized."—H. Goss and H. ROWLAND-BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*February 13th, 1902.*—Mr. F. Noad Clark, President, in the chair.—Mr. South exhibited a specimen of *Cydimon (Urania) leilus* from St. Kitts, one of the Leeward group of the West Indies. The species is common along the north coast of South America and in Trinidad, but has not hitherto been taken in this island.—Mr. McArthur, some specimens of *Eupæcilia gilricomana* taken about forty years ago by Standish, and stated that the species had not since been obtained in this country.—Mr. H. Moore exhibited an exceedingly fine specimen of the orthopteron *Sanaa imperialis* from Sylhet in North India.—Dr. Chapman, specimens of *Hypotia corticalis* from the Riviera, a species having some of the characters of the genera *Pyrallis* and *Phycita*, and for which he had proposed a new genus.—Rev. F. P. Perry, a

large number of Coleoptera from the Transvaal and Orange Colony taken by himself during a short residence in South Africa.

February 27th.—The President in the chair.—Mr. South exhibited a specimen of a very interesting form of *Macaria liturata*, which he had received from Mr. J. Arkle, who took it, with others, in Delamere Forest last year. This form is heavily suffused with fuliginous brown; it has been figured in vol. vi. of Barrett's 'Lepidoptera of the British Islands,' and Mr. Collins has recently proposed the name *nigrofulvata* for it (Entom. xxxiv. 364).—Mr. McArthur, an example of *Agrotis segetum*, having a narrow, very dark marginal band on each of the hind wings, the white ground colour and fringes making it a very conspicuous character.—Mr. Edwards, an unusually large and perfect nest of *Vespa vulgaris*, obtained near Rochester in a hollow tree.—Dr. Chapman, specimens of *Crinopteryx ganciliella* bred from larvæ. It belonged to the lower section of the Adelidæ, and lived in cases like the Coleophoræ, to which it had no structural relation whatever.—Mr. R. Adkin, long bred series of *Acidalia marginepunctata*, and read a paper on them entitled, "A Life-cycle of *Acidalia marginepunctata*." A discussion ensued, when it was pointed out that the genus certainly required subdivision, both on account of diversity of structure and of distinction of habit.—HY. J. TURNER, *Hon. Rep. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY. — *January 20th.*—Mr. H. Willoughby Ellis, Vice-President, in the chair.—The following were exhibited:—By Mr. R. C. Bradley, a series of *Hyetodesia vagans*, a species which is not included in Mr. G. H. Verrall's recent list of British Diptera, but which is common and well-known in Sutton Park; also a specimen of *Sphex planipennis* taken by Mr. J. T. Fountain in Jersey last year. It is a large and handsome Fossore, which is uncommon in Britain. By Mr. C. J. Wainwright, *Rhyssa persuasoria*, one of our largest, handsomest, and rarest Ichneumonids, taken by Mr. J. T. Fountain in Derbyshire last year; also a fine series of *Tropidia scita (milesiformis)*, taken near Paignton, South Devon, in a damp meadow by the sea; it is a species which is common in the fens, but was not known before from the West of England; it was, however, in abundance at this one spot. By Mr. H. Willoughby Ellis, the following Coleoptera:—*Nebria gyllenhali*, from Matlock; *Pterostichus oblongo-punctatus*, from Buxton, and *Liosoma oratulum* var. *collaris*, from Knowle. The last-named was a form which he said some Coleopterists believed to be only an immaturity, but he had taken it at all times of the year, and many specimens were undoubtedly mature. By Mr. Aug. D. Imms, extreme forms of *Satyrus semele*, from Wales; one, very dark and strongly marked, came from near Barmouth, and was taken on the slate; and the other, a light, bleached-looking, but apparently perfect specimen, from near Llandudno, where it was taken on limestone. Mr. Imms read a paper upon "The Structure and Distribution of the Collembola," in which he gave a thorough account of the external and internal anatomy, with some account of the embryology, and illustrated it with black-board drawings and microscope preparations.

February 17th.—*Annual Meeting.*—Mr. G. T. Bethune-Baker, President, in the chair.—The Thirteenth Annual Report of the Council was read, and the Treasurer's Annual Report presented,

showing a slight balance in the Society's favour.—The following officers were elected for 1902:—Mr. G. H. Kenrick, F.E.S., President; Mr. G. T. Bethune-Baker, F.L.S., F.E.S., Vice-President; Mr. R. C. Bradley, Treasurer; Mr. A. H. Martineau, F.E.S., Librarian; and Mr. C. J. Wainwright, F.E.S., Secretary. The following were also elected on to the Council:—Messrs. H. Willoughby Ellis, F.E.S.; J. T. Fountain; W. Harrison, and G. W. Wynn.—Mr. A. D. Imms exhibited, by means of a lantern, a series of microscopic preparations of the Collembola, including specimens of typical species and sections, &c.—Mr. J. T. Fountain showed a series of *Selenia bilunaria*, Esp. (*illunaria*, Hb.), of different broods; including a series bred June to August of var. *juliaria*, Haw., and others bred November to March, all of the usual spring form.—Mr. A. H. Martineau showed Hymenoptera taken at Budleigh Salterton, South Devon, at beginning of August last year, including *Andrena pilipes*, F., and *A. thoracica*, F., both from bramble bloom; *Astutus boops*, Schr., taken at blossoms of gorse; *Andrena denticulata*, Kirb.; *Nomada fucata*, Panz.; *Dasypoda hirtipes*, Latr.; *Hedyeridium roseum*, Rossi, the parasite of *Astutus boops*, Schr.; and *Trypoxylon figulus*, L., with cells which had been found in sand, instead of in the more usual wooden posts.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The Annual Meeting was held at the Royal Institution, Liverpool, on January 13th, Mr. R. Wilding, Vice-President, in the chair.—Mr. Frederick Birch, Joint Secretary, in presenting the Council's report, gave a short *résumé* of the work of the past session. The Treasurer then read his statement, which showed an increased and satisfactory credit balance to be carried forward. The following officers were elected to serve during 1902:—President, Mr. S. L. Capper, F.L.S., F.E.S.; Vice-Presidents, Rev. R. Freeman, M.A., and Dr. H. Dobie; Secretaries, Messrs. Fredk. Birch and E. J. B. Sopp, F.R.Met.Soc., F.E.S.; Treasurer, Dr. J. Cotton, F.E.S.; Librarian, Mr. F. C. Thompson; Council, Messrs. R. Wilding, F. N. Pierce, F.E.S., A. Tippins, H. Tonkin, W. A. Tyerman. In the absence of the President, the retiring Vice-President, Mr. R. Wilding, delivered a most interesting address, reviewing the general entomological work and literature of the first year of the century, with special reference to several matters of local importance. The Rev. R. Freeman proposed, and Mr. F. N. Pierce seconded, a vote of thanks to Mr. Wilding, both for his able address and for his valuable services in the chair during the past year, which was heartily accorded. On the motion of Mr. Sopp, a cordial vote of thanks was also tendered to Mr. Fredk. Birch, for his indefatigable labours as Secretary during the past three sessions. The following exhibits were made during the evening:—*Calioxys mandibularis*, a Hymenopteron new to the British list, taken at Wallasey, by Mr. Birch, who also exhibited, on behalf of the Rev. T. B. Eddrup, various species of Lepidoptera sent for distribution amongst students of the group; *Vanessa c-album*, captured in the Liverpool district, by Mr. G. A. Dunlop; and *Corydia petitveriana*, an attractively marked cockroach from Madras, by Mr. Sopp.

February 10th.—Mr. R. Wilding in the chair.—A valuable paper was read by Mr. Willoughby Gardner on the life-habits of the

Hymenoptera-Aculeata, dealing in a full and complete manner with all that is at present known of the life-history of these most useful hexapods. After describing the characteristic features of the order as a whole, he exhaustively reviewed the various families constituting the section Aculeata, the females of which are armed with a retractile sting. Dealing first with the Heterogyna, or social ants, he gave many facts of interest connected with the instinct and economy of these remarkable insects, and mentioned that most of our indigenous species belonged to the family Formicidæ, or mining ants. He also described the methods pursued by the Fossores in the capture and preservation of their prey. Of the Diploptera, or true wasps, two families are native to Britain; their value on account of their wholesale destruction of lepidopterous and other injurious larvæ being fully discussed. After enumerating the coleopterous and other inmates of the nests of *Vespa vulgaris* and *V. germanica*, the lecturer passed to a consideration of the Anthophila, or bees, alluding to the great part played in nature by these pollen-loving insects in the fertilization of clover and other plants. Having referred to *Colletes cunicularia*, our "Wallasey bee," and *Calioxys mandibularis*, a recent local addition to the British list, the concluding portion of the address was devoted to the life-history of *Apis mellifica*, the common honey bee, in which many interesting, historical, economic, and other matters were ably dealt with. At the close of his paper Mr. Gardner presented his recent monograph on the Hymenoptera-Aculeata of Lancashire and Cheshire to the library of the Society. A hearty vote of thanks was tendered Mr. Gardner for his interesting paper, and also for his welcome gift, after which the following exhibits were made:—*Bembidium saxatile*, from Garston, by Mr. F. Birch; *B. stomoides*, from the River Hodder, by Mr. C. E. Stott; *Tropiphorus tomentosus* (Heswall), *Berosus affinis* (Moreton), *Heptaulacus villosus* and *Ægialia rufa* (Wallasey), *Carcinops 14-striata*, &c., by Mr. R. Wilding; and a pair of the earwig *Pyragra braziliensis*, from Espírito Santo, by Mr. E. J. B. Sopp. Mr. G. O. Day also exhibited some rare Dutch books by Sepp, the life-like coloured figures in which were greatly admired; and Mr. Oulton Harrison showed some excellent life-size photos of lepidopterous larvæ taken direct from nature.—E. J. BURGESS SOPP, *Hon. Sec.*

RECENT LITERATURE.

Handbook of the Natural History of Glasgow and the West of Scotland.
(Pp. i-x; 1-567. Glasgow. 1901.)

A series of handbooks have been prepared by the Local Committee in connection with the Meeting of the British Association for the Advancement of Science, held last year in Glasgow; the volume under notice being one of these. It is edited by G. F. Scott-Elliot, Malcolm Laurie, and J. Barclay Malcolm, and deals with the Fauna, Flora, and Geology of the Clyde area. The several lists seem to have been prepared with care, those treating of the Insecta extending to 103 pages. The number of species enumerated in each of the Orders, with which we are specially concerned, together with the names of the

compilers of the respective lists, and also the nomenclature adopted, are shown in the following table:—

Hymenoptera-Terebrantia (Konow). By And. Adie Dalglish	119	species.
Hymenoptera-Aculeata (Saunders). By J. Russell Malloch	104	„
Lepidoptera. "Macro" (Meyrick). By And. Adie Dalglish	515	„
Lepidoptera. "Micro" (Meyrick). By James J. F. X. King	390	„
Diptera (Verrall). By Percy H. Grimshaw & R. Henderson	506	„
Coleoptera (Sharpe & Fowler). By Anderson Fergusson	988	„
Trichoptera (M'Lachlan). By James J. F. X. King	... 108	„
Hemiptera Heteroptera (Saunders). By John E. Murphy	116	„
Hemiptera Homoptera (Edwards). By J. M. B. Taylor	119	„
Odonata (Lucas). By J. J. F. X. King 8	„
Orthoptera (Burr) By J. J. F. X. King 13	„
Neuroptera-Planipennia (M'Lachlan). By J. J. F. X. King	25	„
Collembola & Thysanura (Carpenter & Evans) By D. A. Boyd	38	„

The sequence of the Orders is somewhat unusual, and we are surprised that no mention is made of the Neuropterous families Psocidæ, Perlidæ, and Ephemeridæ.

Additional value to this important work is the inclusion therein of a large Bathy-Orographical map of the Clyde Basin, which was specially prepared for the Meeting of the British Association.

The Stridulating Organs of Waterbugs (Rhynchota), especially of Corixidæ.

By G. W. KIRKALDY, F.E.S. In the 'Journal of the Quekett Microscopical Club, April, 1901.

AFTER passing carefully in review the observations and opinions of writers who have referred to this subject, from Frisch, in 1740, to Handlirsch, in 1900, the author states his belief that stridulation is brought about in these insects by a method different from any previously suggested. "In 1874 Landois described the 'comb' on the anterior tarsus of the male in *Corixa*, and its action (as he thought) on the last segment of the rostrum." Kirkaldy, however, brings to notice the fact which he has discovered, that there is "on the inner surface of the femora (in the males only), near the base, a specially modified area of minute chitinous pegs arranged in regular rows." These form the *stridulating area*. In the author's opinion "the 'comb' of the *left* tarsus is drawn somewhat obliquely across the femur of the *right* leg, or *vice versa*," and in this way stridulation is brought about. This paper, which extends to fourteen pages, contains much valuable information on the structure and stridulation of waterbugs, the text being illustrated by two clear plates containing details from no fewer than twenty-six different species.

W. J. LUCAS.

Fauna Hawaiiensis.—Vol. i. pp. 277–364. Plates 8 and 9. Hymenoptera Parasitica. By W. H. ASHMEAD (August, 1901). Vol. iii. pp. 1–77. Plates 1–3. Diptera. By P. H. GRIMSHAW (Dec., 1901).

ONE HUNDRED AND TWENTY-EIGHT parasitic Hymenoptera are recorded by Mr. Ashmead, doubtless a small proportion of the forms actually existing in the Hawaiian Isles; of these, eighty-seven are new to science.

Of the fourteen families represented, all have a wide geographical range; the 128 species are distributed among sixty-nine genera, of

which eleven are peculiar, so far, to the islands, nearly all the others being cosmopolitan.

Our previous knowledge of this fauna was very meagre, four papers only being cited. The same remarks apply to the Diptera, only four short papers having been published previously. Mr. Grimshaw records 150 species—106 new to science—but regards the Diptera as still imperfectly known, as 134 species have as yet been noted from a single island. The great families Tipulidæ (s. s.), Tabanidæ, Bombyliidæ, and Empidæ, are entirely absent, while the Orthorrhapha Brachycera are very sparsely represented. The Anthomyiidæ and Drosophilidæ furnish the bulk of the forms, *Drosophila*, Fallén, being represented by nearly fifty species.

G. W. K.

Economic: A. D. HOPKINS, "Insect Enemies of the Spruce in the North-East" (1901, U. S. Dept. Agric. new series, Bull. 28, pp. 1-48; Plates i-xvi).

DR. HOPKINS is well known as the leading American authority on forest-tree insects, and has produced what must prove a valuable aid for practical measures in combating the damage occasioned to spruce by (principally) certain Coleoptera. An excessive death of spruce occurred in the Northern United States during the last century, to the extent of many billions of feet of timber, much of it a total loss. The principal depredator was a hitherto undescribed Scolytid beetle (*Dendroctonus piceaperda*, Hopkins), which attacks even apparently healthy trees, the largest trees and best stands of timber being most affected. The broods of the beetle do not remain in a tree more than a year after it commences to die, and out of one tree from five to seven thousand adults, on an average, may emerge. Their principal enemies are woodpeckers—which destroy from fifty to seventy-five per cent. on many trees in one year—aided by an ant-like predaceous beetle (*Thanasimus*) and a parasitic Hymenopteron (*Bracon simplex*). Remedies are also indicated and discussed. The beetles described are figured detailedly, and photographs of their mines and galleries, and of the trees in various stages of health and decay, are added.

Economic: E. P. FELT, "Scale Insects of Importance, and List of the Species in New York State" (1901, Bull. N. Y. State Mus., ix. pp. 289-377; 15 plates (7 coloured)).

An account, with beautifully executed illustrations, of the principal Coccidæ of New York State, prepared in the detailed and careful manner usual with these Bulletins.

C. DARWIN.—The issue (by John Murray, 432 pp., crown 8vo) of a shilling edition of the 'Origin of Species,' is a noteworthy event in the history of natural science; the printing is clear and good, and the volume is a marvel of cheapness. The same firm has issued a 2s. 6d. edition of the 'Descent of Man,' in which so much entomological information occurs.

G. W. K.

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A LIST OF TORTRICES TAKEN IN SOUTH ESSEX BETWEEN 1885 AND 1901.

BY A. THURNALL.

HAVING recently left Stratford, after residing there more than twenty-six years, I have drawn up the following list, with a few notes, in the hope that it may prove useful to the small number of collectors who are interested in the Micro-Lepidoptera of Essex. During the sixteen or seventeen years which were devoted (as far as my very limited time would allow) to collecting, I have taken in South Essex—principally in the south-western portion of the county—about two hundred and ten species; if I had had more time to spare it is probable that a few more species might have been added to this list. I have included some half-dozen which have been taken in past years by the late Mr. Machin and others, and which in all probability only want looking for to be taken again. I will at some future time make out a list, with notes, of the Pyralididæ, Pterophoridæ, and Crambidæ (including the Phycitidæ), which have been met with by me during the same period and in the same district. In conclusion, if any beginner in the above groups should require assistance in naming captures, I should be most happy to help him, and also to impart what little knowledge I may have acquired as regards habits and food-plants of these most interesting little insects.

Tortrix podana (Scop.).—Generally abundant; the beautiful velvety var. *fusca* (St.) is not rare in both sexes; I bred a number some years ago from larvæ feeding on elder at Stratford. A var. of the female occasionally occurs in colour between the type and this variety.

T. cratægana, Hb.—Decidedly rare; in fact I did not meet with it until last season (July, 1900), when a single specimen, a worn female, was beaten from an oak on the borders of Monkwood, Loughton. Mr. Machin used to take it in the same district years ago.

T. xylostearia, L.—Very common, except, of course, on the salt marshes. The pale yellowish var. *obliquana*, St., not very uncommon. I once bred a large number of the type and a few of the var. from larvæ in rolled-up leaves of elm near Brentwood.

T. sorbiana, Hb.—Not very common, and rather local; I used to beat it from oaks near Brentwood, and have occasionally bred huge females from larvæ feeding on the same trees. Also taken at Wanstead, Loughton, Ongar Park Woods, &c.

T. rosana, Haw.—Generally common throughout, the larva feeding on very many plants. I bred a good many from larvæ feeding on dwarf willow (*Salix repens* var. *ascendens*) some years ago, and, curiously enough, everyone, without exception, came out female.

T. diversana, Hb.—Locally abundant, Wanstead, Brentwood, Warley, Romford, &c. Both beaten and bred from birch and elm. Some collectors, I believe, consider that the larvæ feeding on birch produce a different insect from those found upon elm, but after breeding a fairly large number I fail to see any distinction.

T. cinnamomeana, Tr.—Much more local than the last; a very few specimens beaten at long intervals from beech in Monkwood, and more commonly beaten from larch at Warley; also bred from the latter locality.

T. heparana, Schiff.—Very common throughout; may often be beaten abundantly from hedges towards evening. Seems little given to variation. I have never met with any wide departure from the type.

T. ribeana, Hb.—Perhaps the commonest species in the genus. The two named vars. *cerasana*, Hb., and *grossulariana*, St., also common, the latter especially so.

T. corylana, Fb.—Much less common than the last two species, and the latest of the genus to appear in the imago state. Generally to be obtained by beating oaks, especially the isolated trees. Loughton, Warley, Ongar, &c. This species does not appear to vary much; the only striking var. I ever met with was a small very dark specimen (Aug. 28th, 1891), almost as dark as *heparana*.

T. unifasciana, Dup.—Very common everywhere, often a complete nuisance when working the hedges in the evening. I once bred about thirty from one of those "bird's-nest"-like formations on a hornbeam, very much to my surprise, expecting, of course, to breed *Pyrallis glaucopteralis*, which has been bred from similar formations on birch twigs. The "nest" was taken early in April, and kept in a hat box till the imagos emerged; what they found to live upon has always been a mystery to me.

T. costana, Fb.—Very common, more especially in damp meadows; the var. *latiorana*, Wilk., not uncommon in the salt marshes, and strictly confined to them; more often found in the larva state. I have bred it (the variety) from larvæ feeding on *Aster tripolium* and *Statice limonium*. Thames Haven, Benfleet, and beyond Shoeburyness.

T. viburnana, Fb.—Local, and, as far as my experience goes, confined to the saltings, where the larva is commonly met with on such plants as *Aster tripolium*, folded leaves of *Statice limonium*, and spun-together tops of *Artemisia maritima*. The males always of the dull leaden type, the females reddish and more strongly marked; in some cases the fascia is very plain, in others only faintly shown.

Under the name "*viburnana*" I fancy it will be some day proved that two species are mixed together in this country.

T. palleana, Hb.—A single specimen taken in a boggy place near Upminster, July, 1889. Not met with by me elsewhere in the county.

T. viridana, L.—Only too common (and destructive) in oak woods throughout the county; dozens sometimes coming down at nearly every blow from the beating stick. I have never been fortunate enough to meet with the pretty var. *suttneriana* in Essex.

T. ministrana L.—Pretty generally distributed, and frequently common; to be beaten from birch shrubs and flying over the same at early dusk at the beginning of June. I have never bred this species.

T. forsterana, Fb.—Larva common on ivy, and sometimes honeysuckle. The imago may often be beaten freely from the former at the beginning of July. Some of the females run very large. Does not appear to vary much except in the size of the spots.

Dichelia grotiana, Fb.—Common where it occurs, but seems to be a decidedly local species. I have found it on two or three occasions freely by beating a mixed growth of whitethorn and bramble on Wanstead Flats. Other localities are Upminster, Warley, and Fairmead Bottom, Chingford.

Leptogramma scabrana, Fb.—Used to occur a few years ago at Leyton, close to the spot now covered by the Town Hall buildings, where I used to beat it rarely from an elm hedge. Not met with elsewhere by me.

Peronea sponsana, Fb.—Very common in Epping Forest amongst beech and hornbeam, upon which the larva feeds. What is usually regarded as the type is very rare there; with one or two exceptions all of the many dozens I have examined belong to the very plain variety *lividana*, as described by Wilkinson.

P. schalleriana, L.—Not very common, but distributed widely. I have more often beaten it from blackthorn than anything else. The pretty var. *latifasciana*, Haw. (if, indeed, it is a variety, and not a distinct species), has occurred, but I have not met with it myself.

P. comparana, Hb.—By many entomologists considered merely a variety of the above, is not uncommon in many localities, but not, I think, quite so common as the previous species. I have bred it from a species of willow and also from blackthorn.

P. variegana, Schiff.—May be beaten in numbers from almost every hawthorn hedge in the district. All the named varieties occur, except *albana*, which I believe is more often found in the north of England. The almost black var. *cirrana* is the least common.

P. cristana, Fb.—Still to be found in limited numbers in Epping Forest, but in nothing like the numbers which were taken by the collectors of forty or fifty years ago in the neighbouring Hainault Forest, long since destroyed. I have not taken it anywhere but in the forest, where it may be beaten from hawthorn.

P. hastiana, L.—Not by any means common; a few larvæ have been found near Upminster, Barking, and (formerly) Hainault Forest.

P. umbrana, Hb.—Mr. Machin and others used to get it very sparingly in Epping Forest, but I have spent many hours in many seasons searching in vain for it.

P. ferrugana, Tr.—Common as this little species is in many places, it certainly cannot be called so in South Essex; indeed, I was collecting several seasons before I met with it at all! I have since found the larva sparingly on birch at Loughton, Warley, and Ingatestone. I have bred from them vars. *tripunctata*, *rufana*, Hb., and *gnomana*, Haw.

P. aspersana, Hb.—Decidedly local, but found in several places, of which I may mention Loughton, Upminster, and Woodford Bridge. In addition to its two usual food-plants, *Spiræa filipendula* and *Poterium sanguisorba*, I have found the larvæ on *Potentilla anserina* and *P. tormentilla*.

Rhacodia caudana, Hb.—Well distributed, but never very common, perhaps more common in the Brentwood district; I have beaten the pretty variety *ochracea*, St., from poplar at Warley, and the type generally from sallow and alder.

Teras contaminana, Hb.—Often in hundreds, and in every variety in hedgerows and whitethorn bushes; some of the forms are very bright and pretty. I have bred it from larvæ feeding on flowers as well as leaves of whitethorn.

Dictyopteryx læflingiana, L.—Very common together with the vars. *plumbana*, Hb., and *ectypana* on oak trunks, and may be beaten freely from the boughs of the same wherever I have collected in the county.

D. holmiana, L.—Not very common; may be beaten early in August from hedges, especially those which contain a good quantity of brambles, on which the larva feeds.

D. bergmanniana, L.—Very common everywhere amongst wild and, to a lesser extent, cultivated roses; the larva in folded leaves of the same.

D. forskaleana, L.—Common everywhere amongst sycamore and maple, on which the larva feeds. May often be beaten out in large numbers from these two trees.

Argyrotoxa conwayana, St.—Generally common, together with the var. *subaurantiana*, amongst privet, on which the larva is said to feed, but I have never bred it.

A. audouinana, Dup.—Local and rare. I have beaten out from oak (usually) a very few specimens at Loughton about the third week in June. Not met with elsewhere.

Ptycholoma leacheana, L.—In great abundance among oak, flying swiftly round the branches in the early evening. The pupa very common in the crevices of the oak bark, spun up in a white web.

Ditula hartmanniana, L.—Local, and by no means abundant where it does occur. By the River Lea in one or two places, at rest on young willow trunks. Much more abundant formerly, before so many of the willows on the banks of the river were destroyed.

D. semifasciana, Haw.—Another local species. I have found the larvæ on sallow bushes near Warley, and beaten the imago from the same. Not met with elsewhere.

Penthina corticana, Hb.—Rather local, but not uncommon amongst its food-plant, birch. May be often found at rest on the trunks, but requires rather a sharp eye to detect it, owing to its colours matching the colour of the trunk. Brentwood, Warley, Ingatestone, Ongar, Wanstead Park, &c.

P. betulætana, Haw.—Found in the same localities and in the same way as the last, but much later; in fact, I have this year taken a worn specimen in September.

P. capræana, Hb.—Local and scarce. I have beaten it from *Salix caprea* once or twice at Warley and near Upminster.

P. prælongana, Gn.—Another local and scarce species, occasionally beaten out of birch bushes at Warley and Ingatestone at the end of May.

P. pruniana, Hb.—Very common throughout amongst blackthorn. I once beat out a curious creamy variety exactly corresponding to the var. *nubiferana* of *cynosbatella*. This was at Box Hill, however.

P. ochroleucana, Hb.—Not scarce in hedges where plenty of its food-plant, wild rose, grows. I have occasionally taken it at light.

P. cynosbatella, D. L.—Very common throughout; larva polyphagous. Dock (!), whitethorn, blackthorn, apple, cherry, are some of its food-plants.

P. dimidiana, Tr.—The late Mr. Machin assured me that he once took a specimen at Loughton, but I fancy that, accurate as he was, there must have been some mistake, as its food-plant most certainly does not grow there.

P. gentiana, Hb.—Common in the larva state wherever the teasel grows, seldom seen (unless bred) in the imago state; the finest specimens I ever bred were from teasel heads gathered in the winter of 1890 on Canvey Island.

P. sellana, Hb.—Local, and from its dull colours and quickness of wing is often missed. I have taken a very few at Stanford-le-Hope, Thames Haven, Leigh, and Upminster.

P. carbonana, Dbl.—A single specimen captured by a friend in a boggy place near Upminster is the only record I have. The food-plant, *Stachys palustris*, is not uncommon on the spot. The allied species *fuligana*, Hub., I have not met with.

P. nigricostana, Haw.—Fairly common wherever its food-plant, *S. sylvatica*, grows. Larvæ may be found in the early spring in the dead stems.

Antithesia salicella, L.—Fairly common wherever willows are to be found; at rest usually on the trunks and sometimes on the leaves.

Hedya ocellana, Fb.—Very common, and in great variety throughout amongst whitethorn, on which the larva feeds in May.

H. lariciana, Zell.—Not rare in the Brentwood district on larch, on which tree the larva and pupa may be found. I have not taken it elsewhere in South Essex.

H. pauperana, Frr.—I may just mention this species, which has been taken rarely in North Essex, but so far not in the southern portion, I believe. I took a beautiful series in April last in this county (Surrey).

H. aceriana, Dup.—A little local, but common in many places among *Populus nigra* and other species of poplar; usually at rest on the trunks or any neighbouring fence.

H. dealbana, Fröl.—Very common wherever I have collected amongst poplar, oak, whitethorn, &c. The melanic var. *alnetana* not uncommon.

H. neglectana, Dup.—So often mixed up with the two preceding species by beginners, is locally abundant on willow trunks along the

Lea valley; I have also found it commonly in Wanstead Park and by the river at Chelmsford.

H. serrillana, Dup.—A single specimen beaten from *Salix caprea* between Loughton and Epping is the only one I have taken in the county. My series in the cabinet I took in Kent.

Spilonota incarnatana, Hb., I have never met with, but the late Mr. Machin used to take it rarely in Fairmead Bottom, Chingford, amongst wild rose, and he also bred one specimen. This forest form is very large and brightly coloured.

S. trimaculana, Haw.—Common everywhere amongst hedgerows; the larva feeds in early summer in spun-together tips of whitethorn.

S. rosæcolana, Dbl.—Not rare, but often overlooked from its resemblance to the above. May be beaten from its food-plant, wild rose, and I have occasionally bred it from garden rose. Loughton, Chingford, Woodford, Upminster, may be mentioned as localities for this species.

S. roborana, Tr.—Very often too common amongst cultivated roses, clearing out the unexpanded flower bud, and is equally common amongst the wild species.

P. tripunctana, Fb.—Equally common amongst wild roses in nearly every place where I have collected.

Aspis udmanniana, L.—Amongst its food-plant, bramble, the larva may be collected freely, making a conspicuous bunch of the leaves by spinning them together and pupating therein.

Sideria achatana, Fb.—Fairly distributed amongst whitethorn; the larva, which in appearance and habits resembles *Rhodophæa suavella*, spins two or three dead leaves to a twig of the food-plant, coming out at dusk to feed. Loughton (commonly), near Upminster, Benfleet, &c.

Sericoris bifasciana, Haw.—Used to occur freely on a Scotch fir tree at Wanstead, but I have not seen it for several seasons; the larva was found feeding amongst the flowers early in June.

S. littoralis Curt.—Common amongst thrift in the salt marshes. Wakering, Thames Haven, Benfleet, &c.

S. abscisana, D. L.—Very local, near Tilbury, amongst its food-plant, *Carduus arvensis*.

S. cespitana, Hb.—I have only met with this usually common species on a rough, dry piece of waste ground near Upminster.

S. rivulana, Scop.—The late Mr. Machin told me that he used to take this species freely on one part of Wanstead Flats some forty years ago; it certainly does not occur there now, in fact, I have not seen a specimen in Essex.

S. urtica, Hb., and *lacunana*, Dup.—Both, of course, very abundant everywhere; the latter species is, I should say, about the commonest British Tortrix. I have taken rarely, on the railway bank near Harold Wood station, a beautiful reddish var. of the first species, but have not seen it for some years now.

“Mascotte,” Whitehall Road, Thorton Heath :
October, 1901.

(To be continued.)

DESCRIPTIONS OF TWO NEW SPECIES OF THE GENUS
PLANEMA FROM THE UGANDA PROTECTORATE.

By EMILY MARY SHARPE.

PLANEMA ARENARIA, sp. n.

Allied to *P. consanguinea*, Auriv., but distinguished from that species by the sandy buff ground-colour of both wings.

Primaries. Central area sandy buff, enclosed by a dark brown irregular band from the costa to just above the submedian nervure, this dark band having a second transverse band of sandy buff on the outer edge; the apical area and hind margin greyish brown; a faint brownish shading visible on the costal margin and in the discoidal cell. *Secondaries.* Ground colour sandy buff, relieved by nervular and internervular streaks of brown, from the hind margin to the discoidal cell; a border of greyish brown visible on the upper half of the hind margin, where it graduates down towards the inner margin; a cluster of black spots at the base of the wing. *Underside.* Similar to that of *P. consanguinea*. Expanse, 1.5 in.

The female does not differ from the male, with the exception that the ground colour is paler, as well as the brown markings mentioned above. Expanse, 1.7 in.

Hab. Entebbe, August (*F. J. Jackson coll.*).

PLANEMA DOROTHEE, sp. n.

Allied to *P. gea*, Fabr., and *P. esebria*, Hewits., but differs in having the apical band on the primaries much lighter in colour towards the costa. The hind marginal border on the secondaries is only indicated by a patch of brown on the apical area.

Primaries. Ground colour dark brown, relieved by a broad band of orange-buff on the apical area, but becoming almost white towards the costal margin; a similar patch on the inner margin also fades into white on the basal side; a small orange-buff streak is visible between the first and second median nervules. *Secondaries.* Ground colour orange-buff, a lighter tint occurring near the base; the usual broad hind marginal border only represented by a patch of dark brown on the apical area; the nervules with strongly indicated internervular streaks of dark brown. *Underside.* Closely allied to that of *P. esebria*; the black marking in and beyond the cell on the primaries more heavily indicated, the orange-buff markings showing more white than on the upper surface. Secondaries with the hind marginal border entirely absent; otherwise the spots and markings not differing from those of the allied species. Expanse, 1.5 in.

The female of this species differs from the male above described in having the spots and markings white, instead of orange-buff. Expanse, 1.7 in.

Another specimen agrees with the male, but has the apical band on the primaries white, as well as the minute streak situated between the first and second median nervules. Expanse, 1.4 in.

Hab. Entebbe, October (*Capt. H. B. Ratray*).

MISCELLANEA RHYNCHOTALIA.—No. 3.

By G. W. KIRKALDY, F.E.S.

Fam. REDUVIIDÆ.

* TAPEINUS FUSCIPENNIS (Stål).

Head and pronotum luteo-fulvous; base of elytra, legs, scutellum (except the rufo-flavous point), connexivum above and below, flavescent. Abdomen above pale brownish, apically flavescent. Sterna and abdomen below sordid dilute brownish red, more or less obscure, apico-laterally flavescent. Eyes and elytra black. Antennæ obscure fuscous. Head between the eyes a little wider than an eye. Posterior lobe of pronotum somewhat deeply longitudinally impressed, the impression closely and coarsely punctured. Second segment of antennæ five times as long as first, three-fifths longer than third.

♂. Seventh segment beneath (Verhoeff's nomenclature) very deeply ovally emarginate.

♀. Sixth segment obtuse-angularly emarginate beneath, medianly truncate apically; seventh angularly emarginate, somewhat obsoletely carinate medio-longitudinally. Long. 17-18 mill.

Hab. ASSAM: Chenapungi, Khasia Hills (coll. m. ex coll. Dom. Malcolm Burr). Stål described this from "*Patria ignota*."

† RHYNCHOCORIS NITIDULUS (Fabr.) var. STROPHADES, nov.

Differs from the type by the apically broadly luteous intermediate and posterior femora. The eyes are black, the anterior coxæ luteous. The abdomen above and below (except connexivum) more brownish.

Hab. Kongo (coll. m.).

I possess also an example of *R. nitidulus*, given to me by my friend Mr. Malcolm Burr, in which the left anterior tibia is shining black, the right anterior tibia dilute crimson. The locality is unknown.

Further notes on Vol. I. of Lethierry and Severin's Catalogue:—

P. 181.—RHYNCHOCORIS HAMATUS (Fabr.) is the type of the genus (= *humeralis*, Thunb.). "*Characteres generici e Rh. hamata descripti*" (Westwood).

P. 3.—BRACHYPLATYS, Boisd. 1835 = *Plataspis*, Westw. 1837 = *Platycephala*, Laporte, 1832.

P. 2.—LIBYASPIS, n. n. = *Plataspis*, Leth. and Sev. (type, *coccinelloides*, Lap.).

Plataspis, Westw., is only a replacement of the preoccupied *Platycephala*, Lap., type *metallica*; unless *metallica* can be supposed to differ generically from *vanikorensis*, *Plataspis* should be regarded as a synonym of *Brachyplatys*.

* = *Sminthus*, Leth. and Sev. Cat. Hémipt. iii. p. 113.

† = *Reduvius*, Stål = *Harpactor*, Leth. and Sev.

P. 25.—*CALLIDEA*, Am. Serv. typ., is a synonym of *Calliphara*, Guér., not of *Chrysocoris*, Hahn.

P. 46.—*IROCHROTUS*, Am. Serv. = *Arctocoris*, L. and S., the latter being proposed as a "classical emendation" of *Ursocoris*, which is identical with *Odontoscelis*.

P. 88.—*DINIDOR*, Latr., 1829, Lap. 1832; type, *maculatus* = *Empicoris*, Leth. and Sev.

P. 235.—*DICTYOCORIS*, Mayr. = *Dinidor*, Leth. and Sev.

Vol. II.

P. 30.—*METAPODIESSA*, n. n. subgen. for *Metapodius*, Stål. *Metapodius* is properly homotypical with *Acanthocephala*, Laporte.

P. 86.—*COCHRUS*, Stål. = *Discogaster*, Leth. and Sev.

P. 86.—*DISCOGASTER*, Burm. (1835, Herr.-Schäff. 1840) = *Coryzoplatus*, Spin. Type, *rhomboideus*, Burm.

P. 191.—*ORTHOEA*, Dallas = *Pamera*, Leth. and Sev.

P. 194.—*PTOCHIOMERA*, Say, 1832. type, *nodosus* = *Plociomera*, Leth. and Sev.

Vol. III.

P. 93.—*PTILOCNEMUS*, West. = *Ptilocerus*, Gray = *Maotys*, Am. Serv. Type, *fuscus*, Gray.

P. 93.—*PTILOCNEMIDIA*, n. n. = *Ptilocnemus*, Am. Serv. Type, *lemur*, Westw.

Fam. GERRIDÆ.

EOTRECHUS, gen. nov.

Facies of *Gerris*, Fabr., but distinguished by each tarsus being terminated by two strong curved *apical*, aroliated claws. Tibiæ cylindrical, not tapering.

E. KALIDASA, sp. nov.

Dark blackish brown, tinged with fulvous, anterior lobe of pronotum with broad testaceous longitudinal stripe, posterior lobe more or less rufescent. Elytra with fulvous costa and nervures. Legs and antennæ fulvous, femora paler beneath, blackish at apex. Lateral margins of anterior lobe of pronotum widely testaceous. Head beneath fusco-luteous, centrally black. Pleura black. Venter, including ambulacra, fusco-luteous. Rostrum reaching to middle of mesonotum. Abdomen canaliculate beneath; seventh abdominal segment not produced spinosely or even angulate laterally.

♂. Seventh segment beneath apically roundly emarginate.

♀. Seventh segment beneath apically truncate. Long. 10.5 mill., lat. 1.8 mill.

Hab. CARIN CHEBA, 900–1000 m. L. Fea, 1889 (Mus. Genoa).

GERRIS HESIONE, sp. n.

Distinguished from the other American species of *Limnogonus* by much smaller size and proportionately greater width.

Black, base of head medianly, a round spot near anterior margin of pronotum medianly, lateral margins of pronotum, ferruginous; an-

tennæ, intermediate and posterior legs ferruginous, more or less fumate, anterior femora blackish, basally pallid. Elytra olivaceous, fumate, nervures blackish. Beneath covered with silvery grey pubescence. Head (with eyes) two-fifths wider than long, pronotum roundly angulate posteriorly.

♂. Anterior tibiæ curved. Long. (to apex abd.), $5\frac{1}{2}$ mill.

AMERICA: Florida; Darien (collns. Montandon and Kirkaldy).

GERRIS EUPHROSYNE, sp. n.

Belongs to typical subgenus.

Head and pronotum dark ferruginous; a broad central longitudinal stripe and a sublateral stripe on vertex, a narrow median longitudinal stripe and a sublateral stripe (greatly widened inwardly on anterior lobe) on pronotum, blackish, lateral margins of pronotum pale yellowish. Elytra ferruginous-fumate, nervures blackish. Femora pale fulvous, black at apex, longitudinally banded with same colour; tibiæ and tarsi blackish. Sterna black, a sublateral undulate stripe yellowish. Venter fawn-colour, spotted laterally with black, covered (except laterally) with silver-grey pubescence. Above covered with golden yellow pubescence. Long. 9 mill.

AUSTRALIA: Victoria, Alexandra (collns. Montandon and Kirkaldy).

THE CLASSIFICATION OF GRACILARIA AND ALLIED GENERA.

BY T. A. CHAPMAN, M.D., F.E.S.

(Continued from p. 88.)

I do not propose to go into detail as to the habits of these larvæ; that would be to write a life-history of each species, since, though there are some small groups of *Gracilaria* and *Lithocolletis* in which one life-history might be written for all the species, altering for each little more than the habitat and food-plant, it is more widely the case that each species has special habits of its own—in its form of mine, in its life out of the mine, in its formation of a cocoon, and so on. There are, nevertheless, things that may be glanced at, as they are probably important as regards classification within the group.

The group being by its pupal characters a high one amongst the Incompletæ, there is no doubt that it had amongst its not very remote ancestors a form something like *Bucculatrix* in living at first as a leaf-miner, afterwards as an external larva. *Bucculatrix* may have been derived from the same ancestor, retaining a more primitive pupa, but advancing in having a larva in its later stages living externally and exposed. The primitive Gracilarian must have had a mining larva in its early stages; an external but leaf-rolling larva in the later. It must then

have been a *Gracilaria*, except for the want of the special Gracilarian trophi. On obtaining these, in its first stage, it became a Gracilarian. On passing this specialized larval condition on to the second instar also, it became a *Gracilaria* or *Ornix*.

I have examined a number of species of Gracilarianæ (*Gracilaria* and *Ornix*), and find they all have two stages with Gracilarian trophi; and the same is the case with the two or three species of *Ornix* I have been able to examine.

Mr. Chambers only observed one Gracilarian stage in this group, but there are unquestionably two.

Even in the first instars the habits differ in different sections. *Gracilaria syringella*, for instance, with some half-dozen eggs laid in a row, has the same number of larvæ marching forward abreast for some distance before they form a blotch. *Gracilaria swederella* and *Ornix avellanella* make a narrow thread-like mine, which they lace to and fro into the pattern of a small square gridiron before throwing it into one square blotch, which they leave for a leaf-rolling, or perhaps I ought to say, cone-making existence.

In the genus *Coriscium*, which has always been associated with *Gracilaria*, I am familiar with *brongiardellum* and *cuculipennellum*, but on *sulphurellum* I made no observations. It is described as cone-making, and is therefore congeneric with *cuculipennellum*.

Cuculipennellum is a true *Gracilaria* in its early stages, having two Gracilarian instars, and afterwards inhabiting cones. Its mode of pupation is very special, as it makes a cone such as it makes for feeding in; inside this it slings its cocoon like a hammock, a structure very similar to, but more robust than, that of *Lyonetia clercella*, and it cuts out a little circular exit-hole in the wall of the cone precisely opposite the end of the cocoon.

Brongiardellum has a very different history: the larva makes a very large mine on the upper surface of an oak-leaf, and there are often two or three larvæ in a mine, but this is always the result of the coalescence of as many different mines, that happened to be in one leaf. It never leaves this mine until it does so to pupate, and so far does not differ from such a larva as that of *Gracilaria omissella*. It does differ, however, in a very fundamental point, *viz.* it has three instars of Gracilarian form.

In this it differs from all the other Gracilarias (*sensu stricto*), and is allied to the Lithocolletid division, to which it ought to be transferred.

Though never leaving the mine until it does so to pupate, it differs from such Gracilarias as *omissella* that do the same, in a respect that again unites it to *Lithocolletis* and separates it from *Gracilaria*. In feeding in its Gracilarian stages, *omissella* makes a very small mine like other Gracilarias, and afterwards, when armed with ordinary trophi, it mines in ordinary fashion beyond

the original Gracilarian mine. *Brongniardellum*, on the contrary, makes a very large Gracilarian mine, and in its later stages feeds entirely on the parenchyma so exposed, never in any way extending the mine, a habit which is exactly that of *Lithocolletis*. In separating these two species generically, the name *Coriscium* I fancy adheres to *cuculipennellum*. For *brongniardellum* we have the name *Acrocercops*, provided by Wallengren, whose diagnosis is founded entirely on imaginal characters.

In the European *Lithocolletis* we have a very homogeneous group; all of which have three Gracilarian instars, and all pupate in the mine. Amongst even these there is great variety of habit, both as to the mine itself, the way in which the larva contracts the thin epidermal cover, and in the pupating habits.

Lithocolletis typically separates merely the cuticle when in its Gracilarian stage, and thereafter eats the parenchyma so exposed, meantime contracting the cuticular roof by the silk spun on it.

There are, however, some, and possibly a good many, variations and complications of this habit, of which I may refer to one or two.

Lithocolletis stettinensis mines in alder leaves. It is stated to mine on the upper side, but in one respect it might be more correctly described as mining on the lower. It possesses three instars with flat Gracilarian head, and during these it mines not immediately below the cuticle, but at a lower level; rather, however, above the middle of the leaf, and leaving the ribs of the leaf in the lower half. When, however, in the fourth instar, with ordinary head, &c., it commences to eat; it attacks, not the thick lower layer, but the thin layer of green parenchyma that is attached to the upper cuticle, first eating in a longitudinal line, and as it clears off the parenchyma, spinning silk on the denuded upper cuticle.

The habit of *corylifoliella* is perhaps in some degree intermediate between this and the ordinary habit. *Corylifoliella*, as its first effort, enters a similar layer of the leaf to that in which *stettinensis* mines; but apparently, whilst still in the first skin, leaves this position and mines beneath the upper cuticle, and continues to work in both these mines, one above the other, for some time, a valvular slit in the veil of intermediate parenchyma affording access from the one mine to the other. It, however, leaves the deeper mine of comparatively small size, and extends the subcuticular one to large dimensions. When it assumes an ordinary head it eats the lower parenchyma, there being in fact no parenchyma attached to the upper cuticle. The round piece of intermediate tissue is separated from its attachment to the floor of the mine, and, dried up to a very flimsy scale, is attached to the cuticle forming the roof of the mine, and is covered over, with it, with the silk that contracts and pulls together the roof of the mine.

Chambers's observations, to which I have already called your attention, show that in America there are two other forms within the genus which certainly deserve, and have possibly received since Chambers wrote, generic recognition.

Our English form he calls the cylindrical form. It has three Gracilarian instars, and does most of its feeding as a larva of normal form in the fourth and following instars.

What he calls the flat form has five Gracilarian instars, and does all its feeding in these; in the two following it is only preparing for pupation. Why it should have an idle instar between the last feeding and the cocoon spinning instar, Mr. Chambers does not tell us, and there is something still to be learnt here.

A third section, consisting of only one species (*ornatella* = *ostensackenella*), agrees with the last group in everything except that it is the only species in the genus that leaves the mine for pupation.

I would suggest, if other names have not already been given to these two sections, that the flat group be called *Cameraria*, after Chambers, with type *guttifinitella*; and as regards *ostensackenella*, Fitch, I would place it provisionally in *Leucanthiza*, since the larval habits are identical. If imaginal characters forbid this, it will require a new generic name.

We finally reach the Phyllocnistinæ, in which we have the highest elaboration of the Gracilarian specialization, in so far that there are three Gracilarian instars, but no ordinary larval form afterwards. In the fourth instar the larval mouth-parts are reduced to a spinneret only as a functional organ; there are no functional jaws, either Gracilarian or normal.

Probably the *Cameraria* group of Lithocolletines are as far advanced, having no instar in which the larva feeds with ordinary jaws, and may be regarded as even more specialized in having five instead of three Gracilarian instars; but this, I think, has really an opposite bearing, as five or six is a normal number of moults, and a reduction to three is a very decided specialization.

In any case, however, I have no personal acquaintance with these American forms, and cannot go very far in theorizing about them.

The pupæ (Pupæ Incompletæ) of the lower Neo-Lepidoptera are characterized by having the 7th abdominal segment in the male free, though fixed in the female, and by the pupa leaving the puparium for the emergence of the imago. In the lowest surviving forms we have, the antennæ, wings, legs, &c., are but slightly held together, and equally slightly to the abdominal segments, and these appear to be free up to even the first; so that in Nepticulæ and Cochlidids the first six abdominal segments are all free.

As we advance to higher forms movement is lost in the anterior segment, and, as each segment loses freedom of movement, it tends to become also soldered to the appendages lying in front

of it. In the lowest Lepidoptera Aculeata (Adelidæ), as *Incurvaria* and *Crinopteryx*, we find only the 1st abdominal segment so fixed.

In the higher Lepidoptera Aculeata, in *Tischeria*, and some others, the first two abdominal segments are fixed. Then we come to the great mass of species with Pupæ Incompletæ, in which the first three abdominal segments are fixed. These include the true Tineæ, Cossidæ, Ægeriadæ, all the Tortrices and their allies, &c., as well as the Pterophorina, which are otherwise specialized. This seems to have been the structure of pupa that was most successful as a Pupa Incompleta—at any rate, it is the most popular. We then come to a Pupa Incompleta with the first four abdominal segments fixed. This is the pupa of the Gracilariadæ.

At this point in the evolution most lines of advance seem to have ceased to remain as Pupæ Incompletæ, and to have become Pupæ Obtectæ, *i.e.* they ceased to emerge from their puparia, and they acquired fixity in the 7th segment in the male, and became of the type of Pupa Obsecta that ranges throughout all the Macro-Lepidoptera, the Pyrales, Gelechids, Depressariads, Yponomeutids, Ecophorids, &c.

A Pupa Incompleta, with only two free segments (5 and 6, female; 5, 6, 7, male), seems to have been an unsatisfactory organism, and only obtained a permanent existence in the group we are considering—the Gracilariadæ.

It seems to me extremely probable that amongst the many exotic families of Micros, of which I am entirely ignorant, there is one or more with this pupal structure, attained quite independently of the Gracilariads; since it is a form, so to speak, quite in the highway of ordinary evolution in the Lepidoptera. Up to the present, however, I have not met with such a form.

The process of emerging from the puparium must be less easily performed with only two movable segments, and the tendency must have been very strong to go right forwards at once into the obsect condition.

The pupal condition of the Gracilariadæ is as definite in separating them from all other groups as is the larval one. And, of course, each of these is much more important, taken with the other, than it would be by itself. The larval specialization is so remarkable and unique, that by itself it may be taken as fairly sufficient to define the group, when we consider that there is no strong point—no point at all, in fact—*per contra*. The pupal condition is of very nearly the same weight in associating the species within the group, and delimiting them from others. Either by itself is adequate for this purpose; the two, taken together, are of course not simply twice as potent, but at least four times as potent.

(To be continued.)

NOTES AND OBSERVATIONS.

THE EMERGENCE OF *ANTHERÆA* FROM THE COCOON. — In reference to Mr. Dodd's note on this subject (*ante*, p. 16), I should like to say that in 'Australian Lepidoptera,' a work published in part by Scott and concluded by the Australian Museum, reference is made to the hooks with which the moth makes its exit in the following words:—"It was at this time our attention—being directed to the care of the numerous specimens in our possession emerging from the cocoons—was naturally attracted by the peculiar and loud noise produced by the imago in that operation for freeing itself, which led to a more careful observation, and to the discovery that the sound thus created was caused by two powerful hooked appendages of a horny substance placed one on each side, immediately at the junction of the base of the anterior wing to the thorax while in the act of tearing and destroying the strong fibrous texture of the nest, previously, however, moistened by a solvent fluid, until a rude and irregular aperture was made. During this action the insect maintained a slow rotatory motion until the hooks were plainly visible to us, appearing and disappearing alternately, and quickly and irresistibly calling to mind the sound produced by the gnawing of that domestic torment, the rat." He concludes by remarking that he found all the *Antheræa* were provided with similar hooks; and he also found them in two foreign species of Saturnidæ—i. e. *Tropæa luna* and *Telea polyphemus*. I myself have bred out several *A. astrophela* lately, but, unfortunately, have missed them when emerging. Vol. i. of Mr. A. W. Scott's work was published in 1864; vol. ii. in 1890–1893. — HENRY H. BURTON BRADLEY; 60, Margaret Street, Sydney, March 18th, 1902.

INSECTA OF SURREY. — In the first volume of the 'Victoria History of Surrey' over a hundred pages are devoted to the Insecta, and probably never before has so full a list been got together for any county: perhaps there is no other county for which, with our present knowledge, one equally ample could be prepared. In some cases we are given lists only of the species known, in other cases we have such lists with localities, while of a few orders—*e. g.* the Orthoptera, Neuroptera, Lepidoptera, and Homoptera—the lists are presented in narrative form, and these last we prefer. Those who have worked up a local list of any kind know how difficult it is to make it complete; but there is evidence that the work before us has in general been well done, and this record of Surrey insects may be looked upon as fairly complete, as far as our present knowledge permits. Everyone is of course aware that many additions must be made as time goes on, but that fact will not prevent the present list being of very great use to entomologists who reside or occasionally collect in Surrey, as well as to all who are interested in the distribution of species.

CAPTURES AND FIELD REPORTS.

ASPHALIA DILUTA IN CHESTER DISTRICT. — With reference to the statement in Mr. Arkle's "Notes from the Chester District" (*ante*, p. 117) that *Asphalia diluta* is new to the district, I may mention that I took the species in Delamere Forest, on Aug. 19th, 1893.—Geo. O. DAY; Parr's Bank House, Knutsford, April 14th, 1902.

EARLY APPEARANCE OF EUCHELIA JACOBÆÆ. — I am sending with this a specimen of, I believe, *E. jacobææ*. My wife found it creeping over the garden path, on the 9th inst. Apparently it had only just emerged, the wings being undeveloped. Last year I saw a moth on the wing which I believed to be *E. jacobææ*, and with that exception this is the first specimen I have seen in this neighbourhood—S. J. BEESTON; Shrubbery Hill, Cookley, Kidderminster, April 14th, 1902.

[The moth received from our correspondent is certainly an example of *E. jacobææ*. It was alive when it reached us, but the hind wings were still undeveloped.—ED.]

LARVÆ OF COSSUS LIGNIPERDA AT VAUXHALL. — One morning towards the end of September last (the 25th, I fancy), I was surprised by the discovery of five or six full-grown larvæ of *C. ligniperda* in Vauxhall Park, South Lambeth. They were marching in a business-like manner along one of the gravelled paths, at regular intervals of a couple of yards or so, objects of great interest to the passers-by, who seemed to regard them as a new kind of centipede, and therefore as fair game. Two had already fallen victims. I managed to rescue the remainder and to place them in a position of safety. I also examined the trees in the vicinity as well as the attentions of the park-keeper would permit, but could find none that seemed to have harboured them. I am aware that the larva shows great restlessness when about to pupate, but this seemed very much like a migration in force. Possibly they had been disturbed by pruning operations.—J. B. TETLEY; 5, Wilkinson Street, Albert Square, S.W.

BUTTERFLIES IN MID-SURREY, EASTER, 1902. — Hybernated specimens of *Gonepteryx rhamni* were numerous on Easter Monday in the neighbourhood of Cranleigh, Surrey. I saw at least a dozen during a walk of two or three miles from that town. They were all males with one exception. Specimens of *Vanessa urticaæ*, *V. io*, and *V. polychloros* were also noticed.—J. B. TETLEY; 5, Wilkinson Street, Albert Square, S.W.

MARCH NOTES FROM KENT, 1902. — Very little collecting was done during the first part of March, but a good series of *Hybernica leucophaæaria* was taken, principally from Bexley, including a fair sprinkling of the banded black and white form, and one or two females. *Anisopteryx æscularia* (males) was fairly common from the 9th, but only one *Phigalia pedaria* (*pilosaria*) was seen, and that a small male. I have never yet found this insect in any numbers about here, except in the larval state, and then almost invariably stung. For the first time for four years Easter was spent at home instead of in the New Forest. On the morning of March 29th we started to walk to Paul's Cray, but

the rain came down so hard and persistently that we were forced to beat a retreat. After lunch, however, we were off again, and considering the wretched weather, were much pleased with our takings. On a big lime-tree at Chislehurst we found a fine male *Amphidasys prodromaria*, and a few inches below it *Asphalia flavicornis*. We then proceeded to St. Paul's Cray Common, where we examined the birch-trunks, and were rewarded by a grand pair of *A. flavicornis* in cop., and three *Brephos parthenias*. This is the first time I have found the latter at rest. They were found on the small brown birches, in the forks of two branches, with the wings pressed tightly against them. One or two *Xylocampa lithorhiza*, *Anisopteryx æscularia*, and *Diurnea fagella* were also noticed. The same locality was visited in the afternoon of the next day, which was so miserably cold and dull that a single *Hybernica marginaria* (*progemma*), and a few *Xylocampa lithorhiza* and *D. fagella* were the only insects noticed. The Bank Holiday (March 31st), however, turned out a grand day, and St. Paul's Cray was again attacked. From 2 o'clock till 3.30, *Brephos parthenias* was flying in great numbers, but was, as usual, by no means easy to catch. Three of us succeeded in netting sixteen specimens in all, of which fifteen were males, mostly in good condition. A male *Gonepteryx rhamni* was tempted out by the sunshine, as were also three or four *Vanessa polychloros*, which seems to turn up in most unexpected places. *Taniocampa pulverulenta* (*cruda*), *Anisopteryx æscularia*, and *Diurnea fagella* were also noticed. We heard of another *Amphidasys prodromaria* taken that morning in Pett's Wood. With no night-work, and taking the weather into consideration, I think we should not have done any better in the New Forest. At any rate, the few hours' collecting compare very favourably with our three Easters there.—F. M. B. CARR; 46, Handen Road, Lee, S.E., April 6th, 1902.

SOUTH DEVON MICRO-LEPIDOPTERA.—At the time I wrote my notes on South Devon coast Lepidoptera I had put on one side several micros from there I was doubtful about. These have recently been determined for me by Mr. C. G. Barrett as *Gelechia semidecandrella*, (not uncommon at sugar), *G. mulinella*, and *Dicrorampha flavidorsana*. The last mentioned was taken at Starcross. As at least one of these has, I believe, not previously been recorded for Devonshire, it may be as well to place them on record.—GEO. T. PORRITT; Crosland Hall, Huddersfield, April 4th, 1902.

LEPIDOPTERA IN ROSS-SHIRE IN 1901.—The following is a list of a few Lepidoptera that I took last year in a mountainous part of Ross-shire, about the head waters of the river Carron. The Carron flows out at Bonar Bridge, on the east coast. My first visit there was for a few days about July 19th. The weather was excessively hot, and most of the insects were in poor condition as a result of a long spell of hot weather:—*Pieris napi*. *Argynnis aglaia*, not uncommon; only one was taken, and this at a high altitude, about 1500 ft. It is a male specimen, and decidedly dark. *Cenonympha typhon* (*davus*), a few everywhere about the hills, except on very high ground; nearly all were in poor condition; some of the females, however, were fresh out, and very pale in colour. *Xylophasia rurea* and the var. (?) *combusta*. *Miana*

fasciuncula, common at sugar; and different to the southern forms. *Noctua augur*. *N. rubi*, large in size. *Emmelesia ericetata*. *E. albula*. *Eubolia mensuraria*. *Gnophos obfuscata*, only one. *Larentia didymata*. *L. castata*. *L. pectinitaria*. *Melanthia ocellata*. *Anaitis plagiata*. *Cidaria russata*, a female from which ova were obtained. The larvæ, to my surprise, hybernated when quite small, and have now (beginning of April) started feeding again. I was previously under the impression that this species wintered in the pupal state, while *C. immanata* does so in the egg state. *Coremia munitata*, several females were taken and these deposited eggs. The species was found from 1000 ft. in the valley to nearly 3000 ft. on the tops. From these eggs one imago resulted in the autumn, but the rest of the larvæ hybernated when about half grown, and they have not yet (beginning of April) made their appearance this spring, so I fear they are dead. *Scopula alpinalis* was very common on the tops wherever the right sort of ground occurred.

On my second visit to the same place, in September, I noticed the larvæ of *Lasiocampa callunæ* were common in places. These larvæ, which were about $1\frac{1}{2}$ in. long, were fond of sunning themselves on old bleached stalks of burnt heather. I brought away a good many, and they have successfully hybernated in an airy cage out of doors, and are now (beginning of April) changing their skins and beginning to feed again. *Celæna haworthii*, including one female found at rest on the heather. *Charæas graminis*. *Tapinostola fulva*, common. *Thera juniperata*, two specimens at rest on a juniper-bush, and the empty pupa-skin attached among the needles of the juniper. The juniper-bushes in this district grew quite prone along the ground and were scarcely noticeable, very unlike their erect habit in the South of England. *Cidaria miata*, one example on Sept. 29th. *Phibalapteryx lapidata*, three specimens on Sept. 11th. These were all that I saw, although I spent some time on succeeding days at the same place trying to find more. These three specimens were found about a grassy and rushy spot in a sheltered glen, at about 1250 ft. elevation. W. M. CHRISTY; Watergate, Emsworth, Hants.

DRAGONFLIES IN THE NORFOLK BROADS.—Mr. H. M. Edelsten has forwarded a notice of some dragonflies taken in June last. They were a pair of *Libellula fulva* (June 19th), the male with adult colouring; a pair of *Orthetrum carulescens*, and another of *L. depressa* (June 20th), the male in each case adult in colour; several pairs of *O. cancellatum* (June 19th), but all the males of this species were immature. They were all flying in a quiet corner near a big reed-bed. In the afternoon he had been watching the female *L. fulva* hawking over a little bog-hole, when a male appeared and they copulated, and flew so close to him that he was able to net them both. *O. carulescens* was also taken in cop. *O. cancellatum* was quite plentiful.

Records of some of the scarcer dragonflies are becoming plentiful, and the fear that several of them were disappearing from our midst seems to be quite unfounded. Will *Æschna isosceles* be given a better status during the season that is just commencing? It should be looked for in the broads and fens in June.—W. J. LUCAS; Kingston-on-Thames.

ODONATA OF PARIS. — The following species of Odonata were observed by me in the suburbs and environs of Paris, in the months of June and July, 1901 :—

Libellula quadrimaculata.—One specimen, Forest of Fontainebleau (captured). Others seen.

L. depressa.—Two specimens, males, Forest of Fontainebleau (captured). Others, all males, seen by one of the artificial lakes, Bois de Boulogne.

L. fulva.—One male, Chantilly. This handsome species is entirely new to my collection, and I had never seen it alive before. Like *L. depressa* and *Orthetrum carulescens*, the male is of a lavender blue, the female of a tawny brown. Its abdomen is larger but somewhat narrower than is the case with *L. depressa*, and both longer and broader than that of *O. carulescens*. It is by no means an easy species to secure. I went after one subsequently which alighted on the gravel sweep surrounding an artificial lake at St. Cloud, but failed to catch it. I also missed two (also males) that were flying about pools left by the rain in the lucerne field at Courbevoie. It is also possible that I saw it in the Bois de Boulogne.

Cordulia aenea.—One specimen, Forest of Fontainebleau. I imagined that this was quite new to my collection, but on my return home I found I had a second specimen from Basingstoke Canal, near Byfleet, a year or two since. I had mistaken it at the time for an *Æschna*.

Æschna carulea.—Not in my collection. If I am not greatly mistaken, I saw this species flying hither and thither over the lake in the Bois de Boulogne. The shape of its abdomen precluded the idea of its being a *Libellula*, and on the other hand it was not large enough to be *Anax imperator*.

Calopteryx splendens.—Two or three males seen, and one female captured by the canal, Forest of Fontainebleau. One male afterwards seen at Courbevoie.

Sympetrum striolatum.—One in the Parc Maison Lafitte.

S. flaveolum.—One specimen captured, Forest of Fontainebleau. I fancy it had not long emerged from pupa.

Lestes barbara.—Two specimens captured, Forest of Fontainebleau.

Agrionidæ :—Forest of Fontainebleau and Bois de Boulogne. There are in all probability one or more of the common British species, *Ischnura elegans*, *Agrion pulchellum*, *A. puella*, and *Enallagma cyathigerum*.—F. A. WALKER ; Dun Mallard, Cricklewood.

[Is Dr. Walker quite certain that he is not taking some other species for *C. aenea*—there seems so little resemblance between that species and an *Æschna*? One would hardly expect also to meet with such a northern insect as *Æschna carulea* in the Bois de Boulogne ; might it not rather have been *Brachytron pratense*, or an early *Æschna mixta*? Personally, too, I should hesitate to call *Agrion pulchellum* a common British species, though possibly it is generally plentiful where found at all ; but the known localities do not appear to be very numerous in Britain.—W. J. L.]

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*March 19th, 1902.*—Dr. F. DuCane Godman, D.C.L., F.R.S., Vice-President, in the chair.—Mr. Benaiah W. Adkin, of Brandon House, Morden Hill, Lewisham; Mr. E. D. Bostock, of Texall Lodge, Stafford; Mr. Hubert Edelstein, of the Elms, Forty Hill, Enfield, Middlesex; Capt. Frederick W. Hutton, F.R.S., of the Canterbury Museum, Christchurch, New Zealand; Mr. Frederick William Lambart Sladen, of Ripple Court, Ringwoud, Dover; and Mr. Gerard Orby Sloper, of Westrop House, Highworth, Wiltshire, were elected Fellows of the Society.—Mr. W. J. Kaye exhibited a number of insects from British Guiana, many of them taken by himself, illustrative of Müllerian mimicry. Dr. DuCane Godman remarked that in these regions many different forms of the same butterfly would often occur within a radius of fifty miles, showing a wide range of variation.—Professor E. B. Poulton, F.R.S., exhibited cocoons of *Malacosoma neustria*, collected by Mr. Hamm in 1900, spun upon black currant and apple trees in his garden at Oxford. All of them had been attacked by birds through the leaf, this being the thinnest part of the cocoon, and the pupa thus more easily abstracted. With regard to the resting habit of *Hybernia leucophaea*, he said that he had observed that this moth usually rested in a horizontal position. Dr. Longstaffe said that all the specimens he had observed on green stems affected a similar position, and that he had only found one on a birch tree. Mr. M. Jacoby said that he never found the species on oak at all, but on palings, also in the same position, which facts Professor Poulton said tended to show that the protective instinct of the species was retained in such localities.—Mr. G. T. Porritt exhibited two bred black *Larentia multistrigaria* from Huddersfield, and said that the dark form was rapidly increasing in Yorkshire. Of those already emerged and reared from the same brood, three were normal and two dark.—Dr. Frederick A. Dixey read a paper, illustrated by lantern slides, entitled:—"Notes on some cases of Seasonal Dimorphism in Butterflies, with an account of Experiments made by Mr. Guy A. K. Marshall." He said that he had long since formed the opinion that *Catopsilia crocale*, Cram., was specifically identical with *C. pomona*, Fabr., and had suspected that the differences between them might prove to be seasonal in character. The belief in their specific identity was held by Piepers and by De Nicéville, neither of whom, however, thought that the dimorphism thus shown had any relation to the seasons. In the discussion which followed, Colonel Yerbury said that a temporary rainfall in a dry season in dry places had a marvellous effect in producing intermediate and wet-season forms. Mr. F. Merrifield pointed out the difference between experiments upon tropical and European species. In the tropics there are not any very great distinctions of seasons and temperature, whereas in temperate climates the seasons are clearly marked off from one another. Professor E. B. Poulton expressed his opinion that by breeding species through, Mr. Marshall had proved that one form gives rise directly to the other; the pairing of the two forms being a biological test of very considerable value. Colonel Swinhoe, Dr. Jordan, and Dr. F. DuCane

Godman also joined in the discussion.—Professor E. B. Poulton read a paper on “Mimicry illustrated by the Sanger-Shepherd three-colour process,” supplementary to his paper read at the meeting of the Society on March 5th.—H. Goss and H. ROWLAND-BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 18th, 1902.*—Mr. F. Noad Clark, President, in the chair.—Mr. A. L. Rayward, of Wallington; Mr. B. Stonell, of Clapham; and Mr. S. P. Harry, of Clapham, were elected members.—Dr. Chapman exhibited a number of species which he was placing in the Society's collections, including *Eupithecia consignata*, *Hyboma strigosa*, and *Jochearea alni*, the first of which species was now only to be obtained in one very restricted private locality.—Mr. Kemp, living larvæ and perfect insects of the Coleoptera *Endomychus coccineus*, *Ptilinus pectinicornis*, and *Pyrochroa serraticornis*, the two former from Epping Forest, on hornbeam, and the latter from New Eltham, under moss.—Messrs. Harrison and Main, specimens of the dark var. *nigrofulvata* of *Macaria liturata*, from Delamere Forest.—Mr. F. M. B. Carr, a considerable number of specimens from the New Forest, including, Odonata: *Ischnura pumilio*, female vars. of *Pyrrhosoma nymphula*, *Agrion mercuriale*, and *Gomphus vulgatissimus*; Lepidoptera: a large number of species, among which were *Aventia flexula*, *Lithosia helveola*, bred *Gnophria quadra*, *Nola strigula*, *Triphæna subsequa*, *Heliothis dipsaceus*, *Cleora glabraria*, bred *C. lichenaria*, *Selidosema plumaria*, and *Hyria auroraria*; eggs of the night-jar; a hornet taken from a hollow tree, Easter.—Mr. Nottle, examples of *Agrotis tritici* and *A. agathina*, from Keston.—Mr. Barnett, a living specimen of *Nyssia hispidaria*, female, from Chingford.—Mr. F. Noad Clark, two species of tick new to the British list. They were forwarded to him by Mr. Hewitt, of York, who found them upon guillemots on the Yorkshire cliffs. They had been identified, after considerable trouble, as *Ixodes fimbriatus* and *I. borealis*, both rare and little known species. He also exhibited the common *Ixodes reduvius* for comparison, together with photographs of *I. fimbriatus*.—Dr. Chapman, a living bred specimen of *Endromis versicolor* and some pupæ, in the larva-cases, of *Thyridopteryx ephemeriformis*.—Mr. Edwards, very fine examples of *Ornithoptera lydeus* and *O. socrates*, from the Malays, with *Parnassius imperator*, from Thibet.—Mr. Turner, a long bred series of *Macroglossa stellatarum*, from larvæ obtained at Bromley, Kent; and contributed notes on breeding and habits of the larvæ.—Mr. Lucas, a very large number of lantern-slides to illustrate his remarks on “Entomological localities.” They were chiefly of well-known spots in the New Forest.—Mr. West, of Streatham, also showed a few slides taken from several localities near London.—HY. J. TURNER, *Hon. Rep. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—A well-attended meeting was held in the Memorial Hall, Manchester, on March 10th, Mr. Robt. Newstead, A.L.S., F.E.S., in the chair.—Mr. E. Whitley, of “Clovelly,” Sefton Park, Liverpool, and Oxford University, was elected a member. It was resolved that the next meeting be held in Liverpool, on April 14th, and that Messrs. F. C. Thompson, F. Birch, and E. J. B. Sopp be appointed a sub-committee to examine and

report on the condition of the library of the Society at an early date. A paper on Organic Evolution, with lime-light views, was communicated by Mr. William Hewett, President of the York and District Naturalists' Society, who, whilst dealing very ably with the subject in general, also made special allusion to many points of peculiar interest to entomologists, more particularly with respect to varieties in the Lepidoptera. An interesting discussion followed, on the melanism of *Amphidasys betularia* var. *doubledayiaria* and other moths, in which the chairman, Mr. J. Ray Hardy, of Owens College, Dr. J. Cotton, Messrs. F. N. Pierce, B. H. Crabtree, G. O. Day, and others took part. On the motion of Mr. Pierce, seconded by Mr. E. J. B. Sopp, a hearty vote of thanks was accorded the lecturer for his paper. The fine display of exhibits included, amongst others, the drawing of an extraordinary abnormality in *Prionus californicus*, which was double in every limb; and a series of cases of Coleoptera by Mr. Ray Hardy; *Triphæna interjecta*, *Noctua glareosa*, *N. brunnea*, &c., by Mr. R. Newstead, on behalf of Miss Steele Perkins, of Rhyl; bone variety of *Arctia plantaginis* and var. *hospita*, by Mr. Harold Milne; *Orygia pudibunda*, by Dr. J. Cotton and Mr. F. C. Thompson; varieties of *Abrazas grossulariata*, *Ephyra*, &c., by Mr. B. H. Crabtree; two rare Dutch volumes with coloured plates by Sepp, and Lepidoptera varieties by Mr. G. O. Day; varieties of *Arctia caia*, by Mr. C. F. Johnson; *Arctia lubricipeda*, *A. urticae*, &c., by Mr. Herbert Massey; *Dianthæcia conspersa* by Mr. F. N. Pierce; Perthshire Coleoptera, and *Celioxys mandibularis*, a hymenopteron new to the British list, by Mr. F. Birch; Hemiptera from Bolton, by Mr. Oscar Whittaker; *Anechura bipunctata*, an Armenian earwig, with the Caucasian variety *orientalis*, by Mr. E. J. B. Sopp.—E. J. BURGESS SOPP, *Hon. Secretary*.

BIRMINGHAM ENTOMOLOGICAL SOCIETY. — March 17th. — Mr. G. T. Bethune-Baker, President, in the chair.—Mr. R. C. Bradley exhibited a few Lepidoptera taken in Wyre Forest, including a pair of *Apamea testacea*, which had been taken *in cop.* at 3 p.m.; *Sesia ichneumoniformis*, *Myelois cribrella* (*cribrum*), *Euchloris pustulata* (*bajularia*), and *Hemithea strigata* (*thymiaria*).—Mr. J. T. Fountain, a series of *Lasiocampa quercus*, including local bred females from young larvæ taken in the spring and bred same summer; the specimens running from very light ones to quite dark ones; also some males taken “sembling” at Sutton, with wide light lines approaching var. *callumæ*. In answer to questions, he said that he had also taken full-fed larvæ of the same species at Sutton in the autumn.—Mr. A. D. Imms, *Lepisma saccharina*, taken in a kitchen at West Bromwich; it is one of our four British species of Thysanura.—Mr. C. J. Wainwright, photos of insects and parts of insects taken by Mr. Mearns, of Aberdeen.—Mr. G. T. Bethune-Baker, a drawerful of Lycenidæ of the group Amblypodia, chiefly the genus *Arhopala*, and gave an account of the same, explaining his theories of the origin of the various forms. He believes all were originally brown, and the more blue there is, the more recent the species, roughly speaking.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

Les Odonates du Continent Australien, par M. RENÉ MARTIN, in the 'Mémoires de la Société Zoologique de France,' tome xix. p. 220. Paris: 1901.

IN an article extending to twenty-nine pages M. Martin has given us a concise account of the Australian Dragonflies. Little worked as this region has so far been, still the number of species at least equals those known for Europe, and the number is likely to be added to considerably, whereas the tale for Europe is no doubt almost complete. Just as is the case with the higher animals of Australia, so it is with the dragonfly fauna—it has characteristics peculiarly its own, and we are not surprised to find that about a quarter of the known species are peculiar to that continent; and this individuality shews up even more clearly when reference is made to the genera. Several new species are characterized, and in some cases figures are given which will assist in the identification of them.

W. J. L.

E. P. FELT, "Insects Injurious to Elm Trees." (1902, Fifth Ann. Rep. Fisheries Comm. New York State, pp. 351-79; 3 coloured plates and 7 text figs.)

WE noticed (Entom. xxxiii. p. 254) Dr. Felt's report on insects injurious to maple; the present beautifully prepared memoir deals with the elm, and discusses and figures in their various stages the following insects:—*Galerucella luteola*, *Saperda tridentata*, *Magdalis armicollis* and *barbita* (Coleoptera); *Ewanessa antiopa*, *Thridopteryx ephemeraformis* and *Hyphantria cunea* (Lepidoptera), and *Gossyparia ulmi* (Rhynchota).

G. W. K.

General: H. GADEAU DE KERVILLE, in an exhaustive account of the marine and maritime faunas of a part of Normandy, enumerates 117 species of maritime insects viz. one Thysanuron (*Anurida maritima*), 4 Orthoptera, 65 Coleoptera, 8 Hymenoptera, 2 Lepidoptera, 21 Rhynchota, and 16 Diptera (including the remarkable *Chunio bicolor* discovered by the author). The two Lepidoptera are *Deilephila euphorbiae* and *Zygana trifolii* which, with var. *orobi* and ab. *minoides*, is discussed in some detail ("Recherches sur les faunes marine et maritime de la Normandie; 3^e Voyage," 1901, Bull. Soc. Amis Sci. Nat. Rouen (for 1900), pp. 194-206). We are indebted to the same author for an extended *résumé* on "Galls and Gall-Insects" ("Les Cécidozoaires et leurs Cécidies," 1901, Causeries Sci. Soc. Zool. France, i. pp. 281-307; 2 plates and 1 text figure).

The remarkable genus *Koenenia*, of the Arachnid order *Palpigradi* is fully discussed by H. J. HANSEN ("On six species of *Koenenia*, with remarks on the order *Palpigradi*," 1902, Entom. Tidskv. (for 1901), xxii. pp. 193-240, plates 2-4). The same author has monographed the Myriapod order *Pauropoda* ("On the genera and species of the order *Pauropoda*," 1902, Vidensk. medd. naturh. foren Kjöben. (for 1901), pp. 321-424, plates i.-vi.). English students will congratulate

themselves that this Danish zoologist has contributed his latest three or four fine monographic memoirs upon the Arthropoda in their language.

Rhynchota.—T. PERGANDE works out very fully the interesting and complex life-histories of *Hormaphis hamamelidis* and *Hamamelistes spinosus* (1901, "The Life-history of Two Species of Plant-Lice," U.S. Dep. Agric., Entom., Techn. ser. 9, pp. 1-44; 23 text figs.).

Lepidoptera.—H. GADEAU DE KERVILLE discusses the copulation of Lepidoptera ("L'accouplement des Lépidoptères," 1901, Bull. Soc. Ent. France, pp. 76-81; 5 figs.).

Coleoptera.—The variability of the two-spot ladybird is considered by C. SCHRÖDER ("Die Variabilität der *Adalia bipunctata*, L., gleichzeitig ein Beitrag zur Descendenz-Theorie"; Illustr. Zeitschr. Entom. 1901, No. 24; 1902, Nos. 1 to 5; 1 plate and 5 text figs.).

G. W. K.

J. H. COMSTOCK AND CHUJIRO KOCHI, "The Skeleton of the Head of Insects." 1902. 'American Naturalist,' xxxvi., pp. 13-45; 29 text figs.

THE skeleton of the head, particularly in the more generalized forms, is discussed at some length. The authors consider that the existing nomenclature is "really of little morphological value; for but few of the primitive sclerites of the head have remained distinct, and some of them greatly overshadowed others in their development. The result is that in some cases a named area includes several sclerites, while in others only a portion of a sclerite is included." It is maintained that seven segments exist, with the following sclerites and appendages. "In each section of the middle column the dotted line indicates the division between the sternal and lateral elements of the segment."

SEGMENTS.	SCLERITES.	APPENDAGES.
1. Ocular (Protocerebral).	Vertex and genæ. Front.	Ocular sclerites.
2. Antennal (Deutocerebral).	Antennal sclerites. Clypeus proper.	Antennæ.
3. 2nd Antennal (Tritocerebral).....	Labrum (Mouth). Postgenal.	2nd antennæ of Campodea et al.
4. Mandibular. Antecoxal pieces. Pharyngeal sclerites.	Mandibles. Trochantin (of do.).
5. Superlingual.	Superlinguæ.
6. Maxillary.	Maxillary pleurites. Lingua.	Maxillæ.
7. Labial.	Dorsal cervical sclerites. Lateral do. do. Ventral do. (Gula).	Labium.

G. W. K.

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CONTRIBUTION TO THE LIFE-HISTORY OF *LIPHYRA* *BRASSOLIS*, WESTW.

BY F. P. DODD.

HAVING made many enquiries in Australia with reference to this remarkable butterfly without receiving any information of an important nature, it appears to me that little or nothing is really known of its life-history. One correspondent stated that it is "said to be found in ants' nests in its larval and pupal stages," but presumably he did not know which species of ant it was said to fraternise with. Another correspondent informed me that "his books gave it as a twilight flier, with a query, and that they suggested that larvæ may be carnivorous, feeding on woolly bugs."

I had already seen a female on a warm sunny day in July, 1900, depositing eggs upon a tree, which was in complete possession of the wonderfully interesting green tree ant, *Ecohylla smaragdina*, Fab., which exists here in vast numbers in the coast and mountain scrubs. Upon this tree there were several large nests of the ants, and the butterfly would rapidly fly over the top of the tree once or twice, then come underneath and settle on one of the branches near the trunk; there were four spots to which it returned at different times after its flights, and, upon examination, I found that there were two or three eggs deposited on each. Judging by the number of flights, I believe only one egg was laid at each rest. I have since frequently seen the eggs on other trees in ones, twos, or more; but deposits of two, in several different places, is the number usually to be met with. They are placed on the under side of branches, or protected side of the trunk. I took several of the ova, and in twenty-two days the larvæ, flat oval creatures, appeared, but of course refused to eat, and died. I had taken them upon the chance of their being leaf-eaters, and with the ants merely for protection, as I had found is the case with

several other Lycænids of ours—*Arhopalas* and *Hypolycæna phorbas*. Some weeks later I pulled the habitations of the ants to pieces, but could find no traces of larvæ from the ova left untouched, and was unsuccessful with many other nests examined. Then I made the enquiries alluded to.

During the next few months I examined scores of nests, in the hope of finding larvæ of this, to me, mysterious insect, but without success, and my efforts relaxed considerably. However, eventually I stumbled across a larva when searching an ants' nest for other insects. This specimen was half-grown, the size and shape being about that of a medium-sized lozenge, with a rim, as in a coin, bordering it all round, but raised somewhat along the dorsal surface; colour a very pale yellowish brown, seven dark spots on each side near margin, and across the centre of dorsal surface there were three furrows, reaching nearly to sides; these furrows are constant through all the moults—it must be borne in mind that I have not examined larvæ less than about one-third grown, those obtained from the ova were lost before I had noticed them particularly—nor do they disappear *even when the larval skin becomes the outer pupal shell*. The head, legs, and claspers are in a groove, the edges of which close down tightly all round, consequently they are seldom seen, except of course during progression, when the body is raised a little.

After this discovery, I met with other larvæ, generally larger and of a darker brown, and finally obtained pupæ, and bred out a series of the perfect insect.

I regret my inability to describe the ova, or the extraordinarily shaped larvæ and pupæ; but I trust, Mr. Editor, that you will kindly deal with these, for I send you specimens of same, with examples of the butterfly as it appears soon after emergence and when set—the set specimens, male and female, showing the white fugitive scales on fore wings.* I furnish, however, the following particulars, which may be considered deeply interesting:—

Taking several larvæ and supplying them with ant grubs of various sizes, I soon had the satisfaction of observing one individual approach a half-grown grub, deliberately seize it, and withdraw it from sight; but, being impatient, I turned him over soon after, and he slowly released his hold of the grub; unfortunately I failed to observe anything of the kind again. Finding that the caterpillars did not thrive upon ant larvæ alone, they were supplied with small nests containing ants and pupæ as well, but in a week or so they showed signs of sickness. By changing the ant nests, I kept several other caterpillars for

* We are obliged to our correspondent for the material he has so kindly furnished, and we are very pleased to add that Dr. Chapman has been good enough to undertake the examination of it, and will report thereon in these pages at an early date.—ED.

nearly two weeks; they also became sickly, and had to be returned to nests on the trees. However, they deposited frass, showing that they had been feeding; this is small for such bulky creatures, is grey or greyish white, and is greasy-looking. So, though I cannot positively declare that they exist upon the ant larvæ, I am quite satisfied myself that they do. As five or even six caterpillars may be found in one nest, the quantity of food required by such large creatures must be considerable, though they are very slow growing; but the masses of ant larvæ could be drawn upon without making any great reduction in same. I cannot discern the mandibles of the caterpillar, and incline to the belief that when it comes to be thoroughly examined, the mouth-parts will prove to be of peculiar construction.

As many readers may be sceptical as to this insect subsisting upon ant larvæ, I may mention that at present I have young caterpillars of a moth (female, 20–25 mm.) feeding upon the larvæ of another species of ant which lives in the ground. When given the fresh grubs they soon take a lively interest in them, and affix themselves thereto, and appear to *suck* their victims. None of the grubs are eaten, but they are considerably smaller and much shrivelled when finished with. The moth is even more greasy than our butterfly. None of the grubs given to *L. brassolis* were eaten, but some had the same shrivelled appearance as those given to the moth larvæ.

Moulting.—When the caterpillars are about to cast their skins, they spin a webbed footing, nearly their whole length, to which they affix themselves rather firmly; but in many instances the ants, *utilising the web of their grubs*, secure them still more firmly to their position, the web reaching half-way to, or even up to, the rim. Whether this ant web is added with friendly intent, or with a view to fasten down a larva to get rid of him if possible, is a puzzling matter; still I have not met with any dead larvæ so fastened. Pupæ are occasionally treated in a similar manner, without the escape of the butterflies being prevented. The larger larvæ require three to four days after taking up their moulting position to crawl out of their old skins, which become a little darker, and finally split downwards under the front edge, and right and left along the rim. The old skin retains its shape above, and being relieved of its occupant, regains its former colour, so that, viewed casually, it is difficult to believe that it is an empty shell, as it resembles a real larva so closely.

When the larva is about half grown, the spots so plainly discernible upon young examples become much smaller, but can always be detected, even upon the pupæ. I have only observed the moulting process in several specimens about one-third grown, and in a fair number which had attained almost full size.

Change to the pupa.—*The larval skin is not cast off*, but changes in shape, and becomes a comparatively strong and outer

covering. The insect shrinks away from this and becomes detached, so that it can be shaken like an *Antherea* pupa in its cocoon, or a nut in the shell. The true pupal skin is very thin and transparent, and, provided of course the outer shell is opened, the colour changes of the chrysalis can be observed plainly. After the larva has taken up its position for the transformation, there is no change for thirty-six hours or so, the first being a narrowing of the thoracic portion, with an increased thickness in same. Upon examining the future pupa at this time underneath, it will be noticed that the shell has closed in on each side, enveloping the head and legs completely; no closing in upon the prolegs occurs. For some hours no further alteration takes place, then the remaining portion of the creature contracts, accompanied by a considerable rise in the dorsal surface; the pupal change, so far as can be ascertained from outside observance, now being complete. However, without increasing the length of these notes, I think I can safely state from my experience that it is. For several days after, the shell is liable to split at the outside edge or rim if care in handling same is not taken, the whole of the top being liable to split and come off like a lid, and the chrysalis, being particularly delicate and pulpy, may be killed.

(To be continued.)

ACIDALIA MARGINEPUNCTATA, AB.



THE above figure represents an unusual form of *A. marginepunctata* (*promutata*). Mr. Lucas has so faithfully delineated the peculiar marking of this example that it is unnecessary to say anything beyond stating that the ground colour is grey. The specimen is one of two, both of the same form, taken in August last by Mr. J. P. Lawson, of South View, Clevedon, Somersetshire. They were flying at dusk on a hillside in the neighbourhood.

It may be interesting to add that Mr. Lawson, in reply to an enquiry respecting the ordinary form, writes:—"From what I can gather from other people, typical examples of this species have never been taken at Clevedon, the nearest locality in which it is found being Weston-super-Mare, which is some little distance from here."

RICHARD SOUTH.

NOTES ON THE GENUS *CLUNIO*,* HAL.

By A. D. IMMS.

DURING a short period of work last summer, while occupying the University of Birmingham Table at the Biological Laboratory, Port Erin, I met with some larvæ of a marine Chironomid, and have subsequently devoted a considerable time to working up what literature there exists upon the marine species of the family. The following notes which I have made upon the genus *Clunio* may not be perhaps without some value. Our only British species is in urgent need of further investigation, and probably, if carefully sought for, will not prove so rare as our present knowledge of it seems to warrant.

The genus was erected by Haliday in 1855 for a single species, namely *Clunio marinus*, the males of which he found on the shores of Kerry. It is characterised by the presence of a pair of enormous claspers—a feature which distinguishes it at once from any other Chironomid. In 1856 he recorded stray individuals of the species from Dublin Bay; in 1872 some examples were taken by Dale on the sea-coast at Hastings. From that time onwards until 1894 no contributions appear to have been made to our knowledge of the insect, and Theobald, in his

* As far as I have been able to ascertain, the following is a complete bibliography of the genus *Clunio* :—

1855. A. H. HALIDAY. Nat. Hist. Rev. vol. ii. Proc. p. 54, pl. ii.
 1856. ———— *Ib.*, vol. iii. Proc. p. 73.
 1856. J. R. SCHINER. Ver. Zoo. Bot. Ver. vi. p. 216.
 1864. ———— Fauna Austriaca, Die Fliegen (Diptera). Wien, vol. ii. pp. 593-4.
 1872. C. W. DALE. New and Rare British Diptera. Ent. Month. Mag. xx. p. 214.
 1892. F. V. THEOBALD. An Account of British Flies, pp. 195-6. London.
 1894. G. H. CARPENTER. *Clunio marinus*, Haliday,—A Marine Chironomid. Ent. Month. Mag. p. 129.
 1894. R. CHEVREL. Sur un Diptère Marin du genre *Clunio*, Haliday. Arch. Zool. Exp. et Gen. pp. 583-98.
 1897. H. GADEAU DE KERVILLE. Recherches sur les faunes marine et maritime de la Normandie, 2^e Voyage. Bull. Soc. Rouen, pp. 366-71.
 1898. A. GIARD. Sur l'appareil tracheen de *Clunio marinus*, Haliday. Compte-rendu Assoc. franc. (Congrès de Saint-Etienne), 1^{re} partie, p. 299.
 1898. J. J. KIEFFER. Description d'un Diptère sous-marin recueilli aux Petites-Dalles (Seine-Inférieure). Bull. Ent. Soc. Franc. pp. 105-8.
 1900. H. GADEAU DE KERVILLE. Description, par M. l'abbé J. J. Kieffer, d'une nouvelle espèce de Diptère marin de la famille des Chironomidés (*Clunio bicolor*), et renseignements sur cette espèce, découverte par M. Henri Gadeau de Kerville dans l'anse de Saint-Martin (côte septentrionale du département de la Manche) et trouvée par M. René Chevrel à Saint Briac (Ille-et-Vilaine). Bull. Soc. Rouen, 2 pp.

'British Flies,' is unable to supplement the work of Haliday. Coming to the year 1894, its rediscovery almost simultaneously by Carpenter (from Killiney Bay, Co. Dublin) and Chevrel (from the coasts of Calvados; he calls it *Clunio syzygialis*) filled some of the blanks in the life-history of the insect. Both these authors discovered the eggs, the larva, and the female. The eggs are narrowly spindle-shaped, and are enclosed, like those of *Chironomus*, in a gelatinous green tube. The larva is green, and possesses no ventral blood-gills; it lives among *Cladophora* and other algæ in the rock-pools, and is therefore truly marine. It is worthy of note that blood-gills are similarly wanting in *Chironomus oceanicus*, described by Packard (Proc. Essex Inst. 1868, pp. 41-46) from Salem Harbour, as well as in the larvæ I have met with at Port Erin, and in some of the fresh-water species. The female may be fairly described as apterous, for what remains of the wings is reduced to tiny vestigial appendages; she crawls about over the rocks and weed at low water, and during pairing the male flies about with her held in a straight line with his own body by means of his strong claspers. A full account of the habits of both sexes will be found in Chevrel's paper.* I might mention that in *Halirytus amphibius*, discovered by Eaton in Kerguelen Land, the wings are similarly vestigial; although placed in the Tipulidæ, Sharp considers that it is probably a Chironomid. The degeneration of the wings in the female has been described as the result of complete adaptation to a littoral habitat; for in so tiny and highly fragile an insect, if wings were present, the chances of being blown out to sea would be very great, and an appreciable numerical deterioration of the species would result from the destruction of the eggs. The mouth-parts are very rudimentary in both sexes, a feature which distinguishes the imagines from those of other Chironomids.

Besides *marinus*, two other species of *Clunio* have been described, namely, *C. adriaticus* by Schiner, who states that it is found on the sea-shore among sea products of all kinds, and that Fraunenfeld found it amongst colonies of *Mytilus minimus*; and *C. bicolor* by Kieffer from the French coasts.

Chevrel gives a few observations upon the internal anatomy of the *Clunio* larva, and Giard has described its tracheal system. Nothing is known of the anatomy of the imago.

In conclusion, I wish to state that I submitted this short article to Mr. G. H. Verrall, and I am indebted to his kindness in reading it through, and offering a suggestion upon it.

Zoological Laboratory, University of Birmingham.

* An interesting account is also given by Carpenter in 'Knowledge,' 1901, pp. 197-8.

THE CLASSIFICATION OF GRACILARIA AND ALLIED GENERA.

By T. A. CHAPMAN, M.D., F.E.S.

(Concluded from p. 142.)

In viewing the classifications that have been made of the Gracilariads, we have seen how they have always been placed close to the Lyonetiads, and usually more or less mixed up with them; in accordance, no doubt, with the fact that there is probably no very profound difference in any important character between them in the imago state. The superficial resemblance of *Leucoptera* (*Cemlostoma*) to *Phyllocnistis* is very close indeed.

I am not prepared to advance any larval characters that suffice to distinguish the Lyonetiadæ, but there is a very definite pupal character that is, I think, both inclusive and exclusive. This is that the pupa is entirely immobile, and in a special manner that distinguishes it from other immobile pupæ, such as *Perittia*, *Thyris*, &c. It has never passed through an ordinary obtect stage, in which the wings, &c., usually are attached down to the fourth abdominal segment only. Here the wings, &c., are attached for their whole length to the abdominal segments. In *Lyonetia* the wings and abdominal segments form one mass that tapers to a point—a point to which the wings, antennæ, and third legs reach, as well as the abdominal extremity. This mass is not, however, as solid as it looks. As in Pupæ Incompletæ, all the appendages separate from each other, and with rather the facility one finds in *Nepticula* than with the difficulty that one meets with, say, in *Tortrix*. When the appendages are pushed aside, one inclines to doubt whether they were really at all adherent to the abdominal segments, and these again are found to be quite movable. Still, it is tolerably certain that no movement whatever takes place in the living pupa, hardly even on dehiscence.

In *Leucoptera* the appendages do not come so far down, and the pupa itself is comparatively short and dumpy; still, it agrees with *Lyonetia* in essential structure. We have here, then, a pupa very different indeed from that of Gracilariads. But is it after all very far off from them, if its probable evolution is considered?

If we confine the name Obtect to those pupæ that have reached that character by the same route as, say, Noctuæ have, or by some very similar one, then the Lyonetiads are certainly not Obtectæ. They are a separate modification of the Pupæ Incompletæ. They are consolidated so far that the segments have lost mobility, but are still very primitive as regards the soldering

together of the different parts, appendages, &c. In this respect they appear to be lower rather than higher than the *Gracilariads*. *Gracilaria* is a Pupa Incompleta that has reached, as regards movable segments, the highest point that such a pupa can attain. *Lyonetia* has just passed this point, but is otherwise no higher than *Gracilaria*, whilst both are, as regards imaginal and other structures, still rather low amongst *Micros* above the *Tineæ*. Even pupally, as regards general soldering of appendages, they are lower than *Tortrices*, for instance, which in the matter of movable segments are a stage below them. Further, each in its own way is different from any other pupa.

Taking all these things into account, it is highly probable that the pupa of *Gracilaria* and that of *Lyonetia* are really not very far apart. Each has taken one step forward from a similar form, quite probably a common ancestor; but they have taken it in a different manner.

It might be asked if they be possibly so near as this, whether each form of pupa might not have arisen separately perhaps several times, and whether *Cemiostoma* might not possibly be nearer to *Phyllocnistis*, and *Lyonetia* to *Coriscium*, than *Lyonetia* to *Cemiostoma*, and *Phyllocnistis* to *Coriscium*. Apart from the inherent improbability of this, the larval specializations give it a complete contradiction.

The lateral pseudopods of the larvæ of *Phyllocnistis* and of *Cemiostoma*, and the curious tail-ending of the pupa of *Lyonetia*, and of the larva of *Phyllocnistis*, show that there is close relationship between the two groups, probably in the facility of developing such structures rather than in a common inheritance of them.

Phyllobrostitis daphneella is a very interesting species in several respects to us just here, chiefly in regard to its pupal structure. This places it outside the *Lyonetiadæ*, but very close indeed to it, if we accept the explanation of the pupal alliance that possibly exists between *Gracilaria* and *Lyonetia* that I have hazarded, and, indeed, very strongly enforces the probability of that explanation. At first sight the pupa, though darker in colour, and looking more solid, is very like that of *Cemiostoma*. A closer view, however, shows that it is of a form that I have described as occurring in *Epermenia* (Ent. Trans. 1897), at a time when that was the only one I knew with this structure, viz. with the free segments as in *Gracilaria*, but without the habit of leaving the puparium for emergence. This might very well be a connecting-link between *Lyonetiadæ* and *Gracilaria*.

The classifications that have recently been made of these groups may be taken to be well represented by Meyrick (1895), Spuler (1898), and Rebel (1901). These seem all to be founded more or less on characters of neururation, and the variations in the results are largely due to the personal equation by which each

systematist attributes a little more or a little less value to some slight variations of nervine arrangement.

We may accept the result so far as showing a strong probability that the Gracilariad and Lyonetiad families are somewhat related, and that the genera *Opostega* and *Bucculatrix* are more nearly related to them than perhaps any others of the European fauna.

Meyrick does not divide them into families, and the series of genera including *Lyonetia* and *Gracilaria* reads continuously.

Interpreting this by his phylogenetic table (p. 708) by placing gaps in the list of genera, it is a little less unnatural than it looks; but when we go a little further, and find the connecting link between *Lithocolletis* and *Phyllocnistis* is the terribly impossible one of *Argyresthia*, we feel sure that that table has led Mr. Meyrick into one of the pitfalls such tables open in all directions, even for the most wary.

Mr. Meyrick, however, discussed all these genera rather fully in the 'Transactions' of the Sydney Linnean Society in 1881, with results that are but obscurely shown in his Handbook. He recognizes, from geographical reasons, that *Gracillaria* is an older form than *Lithocolletis*, and that the two groups are closely allied from their larvæ having the same number of ventral prolegs, viz. 6, in their post-Gracilarian stage. He does not, however, mention the Gracilarian trophi. I disagree with him when he places *Phyllocnistis* with *Cemiostoma*, as he does still, and in separating *Bedellia* from *Lyonetia*, and associating it with other forms that are outside this group.

It is rather outside this paper, but it may be noted that he then placed *Nepticula* high in this group, and in the 'Handbook' he places it at the top of the group containing our Gracilarians; whilst the wing-structure and the pupal development both show that it is as low as, or rather lower than, the lowest *Adelidæ* (Tineæ Aculeatæ), though on a different line. Apart from these points of disagreement, and taking into account that his classification is based almost entirely on imaginal characters, one admires the grasp he shows of the generic relationships, and how closely he approaches the true phylogeny. It must be remembered that, in taking my own results to be more correct than his, I am accepting his facts and conclusions to a great extent, whilst modifying them by other series of facts; and that but for the sound and masterly foundation laid by Meyrick, Chambers, and Stainton, my own contribution would have been of little effect.

Spuler and Rebel divide them into families. I am not in possession of Lord Walsingham's classification of these genera, beyond what I have been able to gather from a paper in the 'Proceedings' of the Zoological Society for 1897. From this it appears that he associates together *Bedellia*, *Bucculatrix*, and

Tischeria. Where he places *Phyllocnistis* does not appear, but I rather suspect in *Lyonetiadæ*. *Lithocolletis* he places under *Gracilarianæ*, but does not apparently subdivide it in any way. *Gracilaria*, however, is more or less subdivided, and several new genera are given. This arrangement does not quite accord with Meyrick's, which, however, as concerns the *Tineides* generally, he approves.

MEYRICK, 1895.

Opostega.
Bucculatrix.
Oinophila.

Lithocolletis.
Ornix.
Coriscium.
Gracilaria.

Leucoptera (*Cemiostoma*).
Lyonetia.
Phyllocnistis.

Bedellia.
Tischeria.
Oenoserostoma.

SPULER, 1898.

VIII. GRACILARIDÆ.

Gracilarinæ—*Gracilaria*.
Coriscium.
Ornix.

Lithocolletinæ—*Lithocolletis*.
Bedellia.
Bucculatrix.

IX. ŒNOPHILIDÆ.

Œnophila.

X. CEMIOSTOMIDÆ.

Cemiostominæ—*Cemiostoma*.
 Phyllocnistinæ—*Phyllocnistis*.

XI. LYONETIDÆ.

Phyllobrostis.
Lyonetia.
Opostega.

TINÆ ACULEATÆ.

Tischerinæ—*Tischeria*.

REBEL (STAUDINGER), 1901.

GRACILARIIDÆ.

Gracilariinæ—*Gracilaria*.

Coriscium.

Ornix.

Lithocolletinæ—*Bedellia*.

Lithocolletis.

Palumbinæ—*Tischeria*.

LYONETIIDÆ.

Lyonetiinæ—*Lyonetia*.

Phyllobrostitis.

Phyllocnistinæ—*Phyllocnistis*.

Cemiostoma.

Bucculatrix.

Opogona.

Opostega.

Of the various other genera associated with the Gracilariads and Lyonetiads in the several systems we have been considering, I may say that my knowledge of the early stages does not enable me to place *Oinophila*, *Opostega*, *Ocnerostoma*, *Palumbina*, or *Opogona*; but except *Palumbina*, if there be such a thing, I doubt whether any of them are Gracilariads.

Tischeria and *Bucculatrix*, about which I do know something, happen also to be those that have been most persistently placed here. Most certainly neither of them are either Gracilariads or Lyonetiads.

Spuler has so far recognized this, as regards *Tischeria*, as to take it right away, and place it in the Tineæ Aculeatæ, where also it is certainly out of place.

The pupa of *Tischeria* has only two fixed segments, though the third begins to lose freedom at the abdominal base, and is therefore at a much earlier stage of evolution than our Gracilariads, nor is the larva specialized like them. It is not an Aculeate, as it has no piercing ovipositor, nor has it spiculated wing-membrane. So far as my knowledge goes, I incline to place it alone in a family by itself.

Bucculatrix also wants the peculiar juvenile larval trophi, and the pupa is only a little in advance of that of *Tischeria*. It has the two basal segments fixed, and the third is all but fixed.

I should classify these genera as follows:—

GRACILARIAN COHORT.

- I. GRACILARIADÆ.—Larva with "Gracilarian" trophi in first two or more stages. Pupa Incompleta 1 to 4 abdominal fixed.

1. Gracilariæ.—First two larval stages “Gracilarian.”
 - a. *Gracilaria*.
 - b. *Coriscium* (*cuculipennellum*).
 - c. *Ornix*.
 2. Lithocolletinæ.—First three or more stages “Gracilarian” 6 or 7 larval instars.
 - a. *Lithocolletis* (European group).
 - b. *Cameraria** (type, *guttifinitella*).
 - c. *Leucanthiza* (*ostensackenella*, Fitch).
 - d. *Acrocercops* (type, *brongniardellum*).
 3. Phyllocnistinæ.—Three Gracilarian stages and 1 modified normal stage (4 larval instars).
 - a. *Phyllocnistis*.
- II. PHYLLOBROSTIDÆ.—Pupa does not leave puparium, but 5 and 6 free, and 7 in ♂ (larva normal?).
1. Phyllobrostinæ.
 - a. *Phyllobrostis*.
- III. LYONETIADÆ.—Pupa immobile, fusion of parts feeble (larva normal).
1. Leucopterinæ. — Pupa with appendages shorter than abdomen.
 - a. *Leucoptera* (*Cemiostoma*).
 2. Lyonetianæ. — Appendages reach end of pupa, weakly fused.
 - a. *Lyonetia*.
 3. Bedellianæ.—Appendages to end of pupa, rather firmly fused.
 - a. *Bedellia*.
- Somewhere else, and at a lower level, but not together—
Bucculatrix.
Tischeria.

Bedellia is pupally very similar to *Lyonetia*, but has advanced to a much greater solidity and fixity of parts, sufficiently possibly to require that it should be placed in a separate subfamily.

MISCELLANEA RHYNCHOTALIA.—No. 4 (HETEROPTERA).

By G. W. KIRKALDY, F.E.S.

1. ANTILOCHUS COQUEBERTII (Fabr.).—Kangra Valley, India, 4500 ft. (G. C. Dudgeon).
2. DYSDERCUS CINGULATUS (Fabr.).—Red form; Kangra Valley, as above.
3. D. RUFICOLLIS (Linn.).—Curaçao (collns. Sceldrayers and mine).

* “Of or belonging to Chambers.”

4. *D. SUPERSTITIOSUS* (Fabr.). — South Africa; Transkei (G. C. Barrett).

5. *NYSIUS RAPHANUS*, W. R. Howard. — 1872, Phillips's 'Southern Planter' (sec. Riley), and 1872, 'Country Gentleman,' Sept. 15th (sec. Riley), and 'Canad. Entom.' iv. p. 409. = *N. destructor*, Riley, 1873, 'Fifth Missouri Report,' p. 113, fig. 41.

Riley admits (*l. c.* p. 111) that Howard's description was published before his own, and that the two names refer to the same species.

6. *SEPHINA VINULA* (Stål). — Jamaica (C. B. Taylor). The ground colour of the two examples I possess is as red as that of *S. maculata* (Dallas) from the same island. This species has not, I believe, been recorded before from Jamaica.

7. *MORMIDEA MONTANDONI*, sp. n.

This handsome little species combines the characters of the typical subgenus and *Melanochila*, Stål. It is separated from all the other described species (except *M. lugens* (Fabr.)) by the deflexed head and transversely callose-fasciate pronotum. From *M. lugens* it is distinguished by the colour of the head and bucculæ, the general picturation, and by the pronotal fascia being practically entire.

Bronzy black; tylus, lateral margins of head, anterior and lateral margins of pronotum, a submedian fascia and the latero-basal margin of the pronotum, the three sides of the scutellum, two lateral and a sublateral stripe on corium, clear pale yellow. Connexivum above and entire ventral surface (including antennæ, bucculæ, and legs) dilute fusco-testaceous. Abdomen beneath with seven obscure, slightly darker, longitudinal stripes at subequal distances apart. Membrane bronzy fumate. Femora and tibiæ speckled with black, apical half of third and the fourth segment of antennæ black, first and second more or less blackish. Head anteriorly somewhat deflexed; rostrum reaching to posterior coxæ, first segment to base of head. Antennæ short, fourth segment about three-fifths longer than the third, which is slightly longer than the second, which is two-thirds longer than the first. Head, pronotum, scutellum, and elytra (except the subcallose or subreflexed pallid parts) strongly impresso-punctate (the outer corial stripe sometimes somewhat sparingly so). Pronotum a little before the middle with a callose, *entire* (or almost entire) transverse fascia. Pronotum antero-laterally obtusely denticulate, lateral angles acuminate spinose. Scutellum not callosely spotted. Pleura sparsely punctured. Apical angles of abdominal segments acute, somewhat prominent. Long. $7\frac{1}{2}$ – $8\frac{1}{2}$ mill., lat. (across pronotal spines) $5\frac{1}{2}$ – $5\frac{3}{4}$ mill.

Hab. ECUADOR, Ambato (collns. A. L. Montandon and mine).

I have great pleasure in naming this well-marked species after my friend Mr. A. L. Montandon, our chief authority on some branches of the Cimicidæ.

GELASTASPIS, gen. nov.

Closely allied to *Ceratocoris*, White, and more especially *Libyaspis*, Kirkaldy, but differs from them by the form of the head (at least in the males).

Roundly convex. The upper surface, the head beneath, and the laminate parts of the sterna closely but irregularly punctured. Head horizontal, tylus small but distinct. Eyes small. Ocelli close to base of head. Bucculae very short, elevated, anteriorly not touching clypeus. Head (with eyes) narrower than the apical margin of the pronotum; antennae inserted a little nearer to the base of the rostrum than to the eyes. Head strongly callosely tuberculate between insertion of antennae and intero-basal part of head, and also callosely elevated between the former and the eyes. Apical margin of pronotum widely and minutely emarginate, briefly truncate in the middle. Pronotum strongly elevated posteriorly, sinuately impressed in the middle on the anterior margin, lateral margins rounded. Prosternum strongly and profoundly depressed between the true sterna and the expanded laminate parts. Mesosternum laminate laterally. Stink-orifices simple, elongate. Coxae almost contiguous. Spiracles at lateral margins of abdominal segments, not on connexivum.

♂. Tylus very short, juga meeting in front of the eyes, and produced somewhat overlappingly, about $3\frac{2}{3}$ times (or more) as long as tylus (to base of head); juga not forming a single curve together, the anterior margin of head being thus angularly emarginate in the middle. Antennae very short, second segment one-half longer than the first, which is subequal to the third, fourth one-seventh longer than third. Distance between an ocellus and the nearest eye about three times as great as between the ocelli. Fifth abdominal segment (Verhoeff's nomenclature) beneath apically acutely emarginate, nearly touching apex of fourth in the middle; sixth beneath apically rotundately emarginate.

♀. Tylus more rounded, and shorter than in the male. From base of head to apex of tylus, scarcely shorter than the length of the juga in front of tylus. Eyes sessile. Second segment of antennae about equal in length to the first. Distance between an ocellus and the nearest eye about seven-twelfths greater than between the ocelli. Apical margin of fifth segment of abdomen beneath obtuse-angled emarginate, sixth rotundately emarginate.

8. G. BROWNI, sp. nov.

Above flavescent or flavo-testaceous, irregularly speckled, blotched, and marmorate with blackish brown. Beneath black; the laminate parts flavescent, variegated as above. Antennae, rostrum, legs, &c., pale rufo-testaceous. Abdomen beneath laterally more or less pallid in wedges. First segment of rostrum reaching to the middle of the prosternum, second to middle of mesosternum, third to middle of metasternum, fourth reaching beyond posterior coxae. Long. ♂ 13-13½ mill.; ♀ 12 mill., lat. 9½ mill.

Hab. BRITISH CENTRAL AFRICA, Mlanji, Thornwood Estate (Henry Brown). On coffee, in company with *Antestia lineati-*

collis Stål (= *Aegaleus bechuana*, Kirk.), *Libyaspis wahlbergii* (Stål), &c. Of the last named, there is at present only a single mangled male, without scutellum; but I think the identification is correct.

I have great pleasure in naming this species after its discoverer, Mr. Henry Brown. The difference of head-structure in the sexes will separate the genus from *Libyaspis*, the only genus with which it can be confused. In *G. browni*, the length of the antennal segments, and of the head, &c., vary slightly; while the amount of dark blotching is much less in one male than in the other.

9. AMORGIUS CORDOFANUS (Mayr, 1852, larva), (= *niloticum*, Stål, 1854).—Kangra Valley, 4500 ft. (G. C. Dudgeon). Obligingly determined as *niloticum* by Mr. A. L. Montandon.

10. My friend Mr. E. P. van Duzee considers (*in litt.*) that I have fallen into error in placing *Liburnia* as a synonym of *Embolophora* (Entom. 1901, p. 340). On looking again into the matter, I quite agree with him that *Embolophora*, 1853, is not synonymous with *Liburnia* as understood by later authors. The five species included in *Liburnia* by him in 1866 (Hem. Afric. iv. pp. 179-81), however, belong to at least three genera, and no type is stated.

A LIST OF TORTRICES TAKEN IN SOUTH ESSEX BETWEEN 1885 AND 1901.

By A. THURNALL.

(Continued from p. 134.)

Roxana arcuana, L.—This beautiful insect usually occurs pretty freely wherever oak and bracken are growing together. I have still to learn how, where, and when the larva feeds, and upon which of these two very distantly related plants!

Euchromia purpurana, Haw.—Local, but occurs in several places, usually preferring rough uncultivated ground; not often in good condition when captured. Larva on roots of dandelion and other allied composites in May. Warley, Thames Haven (sea wall), Upminster, &c. My darkest and largest specimens came from Wicken.

Orthotenia striana, Schiff.—Generally common in similar localities to the last; I have met with it in all the localities where I have collected. Larva feeds in the "crown" of the dandelion and other composites. The female is not so readily obtained, and is very much smaller.

O. (?) branderiana, L.—I have taken this in three localities: Wanstead (but not for some years), Ongar Park Woods, and in the neighbourhood of Colchester amongst aspen.

O. ericetana.—This species surely ought to be found, but I am obliged to confess that I have never seen a specimen alive either in Essex or any other county!

Eriopsela fractifasciana, Haw.—Rare and local; two or three specimens were taken by me some years ago in an open space in Epping Forest, somewhat to my surprise. I have bred it in May from larvæ taken at Box Hill the previous autumn, feeding underneath the radical leaves of *Scabiosa columbaria*.

Phthoechroa rugosana, St.—Not uncommon, flying at dusk in early June along hedgerows, and generally worn. The larva is more commonly met with in July and August, feeding in the fruit and shoots of *Bryonia dioica*. This insect should be killed at once, as it is usually very restless when boxed.

Cnephasia musculana, Hb.—Common generally; may be beaten, usually rather freely, in May from whitethorn and birch shrubs.

Sciaphila nubilana, Hb.—Often in swarms, the males only, round whitethorn and blackthorn (upon which the larva feeds in May). A species which soon gets worn, and is best bred, thereby ensuring a good set of females, which are not free fliers.

S. conspersana, Dougl.—Local, but occurs in a few localities on the coast; I have not met with it inland. Near St. Osyth, near Brightlingsea, and about fifteen years ago near Southend, on ground now covered with buildings, I believe.

S. subjectana, St.—Swarming almost everywhere; an old wooden fence skirting a dry meadow often finds a resting place for hundreds of this variable little moth.

S. virgaureana, Tr.—Common, but not nearly so much so as the last species; although commonly found with it at rest on fences, I have quite as often beaten it from oaks, &c.; the shelter afforded by trees seems to be more acceptable to this insect than to *subjectana*.

S. pascuana, Hb.—Distributed, but much more uncommon than the last species. I have found it on fences in the Lea valley, and bred it from larvæ found at Stanford-le-Hope in spun-together tops of milfoil. A very curious form of this insect occurs only in the salt marshes; pale yellowish, or straw colour, would roughly describe it. I have bred this from a folded leaf of *Aster tripolium*.

S. chrysanthæana, Dup.—Not common, but has occurred in many places. Near Upminster, Harold Wood, Warley, Leyton Marshes, may be mentioned. I found this larva on two occasions—the first week in June, 1890, and 1891, at Harold Wood, feeding on the leaves of *Tussilago farfara*, in some cases turning down a lobe of the leaf, and in others puckering the leaf by partly drawing two portions together with silk. Of course, I expected some common Pyrale to appear, possibly *lutealis*, and I was greatly surprised when this insect came out. About eight were bred.

S. sinuana, St.—Local, as, indeed, it seems to be everywhere. I have only taken it near Brentwood; a single male at rest on an oak, but a fair number of larvæ taken on what I expect is its only food-plant—viz. the spun-together flower-heads of the wild hyacinth (*Scilla nutans*). Eleven were bred this summer, and thirteen last year (1900). Some of the females are very fine.

S. (?) hybridana, Hb.—Fairly common; frequently found amongst elm bushes and blackthorns, on one or both of which I expect the larva feeds, but many hours have been spent in vain looking for it! I once bred a single specimen from a pupa spun up in a composite

flower, but I am inclined to think that the larva had merely gone there to pupate.

S. ictericana, Haw.—Very common throughout, often a nuisance when collecting at dusk. The larva is polyphagous. *Lychnis*, *Senecio* (three species), and *Aster tripolium* may be mentioned as common food-plants.

Capua favillaceana, Hb.—A true wood insect, common in many places; Epping Forest, Brentwood and Warley, Ingatestone, Upminster, &c. I have never met with the larva, but should imagine oak or hornbeam to be likely foods.

Bactra lanceolana, Hb.—Common in boggy places throughout, and in great variety. The larva may be found well on in May, feeding and afterwards pupating in the stems of *Juncus conglomeratus*.

B. furfurana, Haw.—Excessively local. I have only met with it in the marshes bordering the River Lea near Lea Bridge. Early in June it may be disturbed from its food-plant, *Eleocharis palustris*, in the stems of which it feeds and pupates. Its habits in all stages are exactly similar to *lanceolana*. I bred this species—for the first time in England, I believe—in 1894.

Phoxopteryx siculana, Hb.—Rare and local. One or two worn specimens beaten from *Rhamnus* near Brentwood. Mr. Harwood takes it more freely near Colchester, I believe.

P. uncana.—Pretty generally amongst ling and birch shrubs. Loughton, Epping, Warley, and several other heathy places.

P. myrtillana.—Hardly an insect one would expect to find in South Essex. Nevertheless I took a fine male at Temple Mills, near Stratford, near the railway sidings (June 22nd, 1890). I fancy it must have been conveyed from Yorkshire by one of the numerous goods-trains which run between Doncaster and London on the Great Eastern Railway.

P. lundana, Fb.—Not very common, but widely distributed. Double brooded. I have taken it near Stanford, Harold Wood railway bank, Loughton (rarely), Upminster, &c.

P. mitterpacheriana, Schiff.—Common generally amongst oak and beech, in the folded leaves of which trees the larva feeds in the autumn, pupating therein in the spring. A very beautiful species when fresh from the pupa.

P. upupana, H. S.—Scarce and local. Near Loughton, Warley, and near Ingatestone, always among birch shrubs, the food-plant of the larva.

P. lactana, Fb.—Another local species. I have found it not rarely in woods near Warley and Childerditch, also in Ongar Park Woods among aspens.

Grapholitha paykulliana, D. L.—Common amongst birch, the larva feeding in the catkins in the spring.

G. nisella, Clerck.—Fairly common, and very variable; on aspen trunks only (I have never found it on willow). The named vars. all occur. Wanstead, near Loughton, Ongar, &c.

(To be continued.)

NOTES AND OBSERVATIONS.

THE NATIONAL COLLECTION OF BRITISH LEPIDOPTERA.—As this collection in the Natural History Museum at South Kensington is now being rearranged, revised, and augmented, a convenient opportunity is afforded for making it what we all wish it to be, that is, thoroughly representative of the Lepidoptera of the British Islands.

One very important improvement would be the addition, in as much detail as possible, of the early stages of each species. It is hardly to be hoped, however, that this desirable end could be attained in any way approaching completeness without the assistance of the entomological public. We therefore venture to ask our readers to help the Museum to effect this useful work by contributing whatever material, either living or preserved, that they may have to spare. There are already larvæ and pupæ of a few species in the collection, but all the examples are not good, so that gifts of ova, larvæ and pupæ of any species would be acceptable. Lists of presentations, with names of donors, will be published in this Journal each month.

HEPIALUS HUMULI VAR. THULENSIS, Newman.—In these days of priority names, why should not justice be done to the distinguished first editor of the 'Entomologist'? Mr. Newman first named the Shetland form of *H. humuli* (Entom. ii. 162), and his name was accepted by Mr. Crotch in the same vol. p. 176. I often wonder why Mr. Jenner Weir, in the 'Entomologist,' vol. xiii. p. 250 (plate of *H. humuli* vars.), adopted the name *hethlandica*, Stgr., 1871, in preference to *thuliensis*, Newman, 1865.—C. W. DALE; Glanvilles Wootton. May 5th, 1902.

[See also Entom. xxvi. 100; and Staud. Cat. (3), i. 410.—ED.]

CAPTURES AND FIELD REPORTS.

NEW FOREST NOTES (1902).—The last week in April this year was spent in the New Forest. We were favoured with wonderfully fine weather on the whole, but, though fine, a strong east wind prevailed, which was very bad for collecting. Treacle was tried on two occasions, but, except for a very few *Cerastis vaccinii*, and a large army of beetles and earwigs, nothing was attracted. Blackthorn blossom, of which there was plenty, was a trifle better, but very little. A few each of *C. vaccinii*, *Teniocampa cruda* (worn), *T. stabilis* (worn), and *T. gothica* (in fine condition) were observed at the blossom, with single examples of *Trachea piniperda*, *Xylina socia*, *Scopelosoma satellitia*, *Anticlea badiata*, *A. nigrofasciaria* (*derivata*), and *Hybernia marginaria* (worn). *Eupithecia abbreviata* common. On the wing the following additions were made:—*Pachnobia rubricosa* (one, in good condition), *Ligdia adustata* (one), *Selenia illunaria* (three males), *S. tetrabunaria* (one male, unfortunately badly damaged), and *Anticlea nigrofasciaria* (one).

Day-work was none too good either. Butterflies were in fair numbers, especially the hibernated species. *Gonepteryx rhamni* was much in evidence, both sexes being well represented. *Vanessa polychloros*, common. *V. io*, five examples seen, the two specimens netted

being in wonderfully good condition. *V. urticae*, a few. Of the spring butterflies, *Pararge aegeria* was the commonest, but though so freshly emerged, a good number had the wings torn. *Pieris rapae* occurred sparingly, as did *Cyaniris (Lycæna) argiolus*, and Mr. Lucas took *Syrichthus malvae*.

By far the most interesting moth was *Boarmia cinctaria*, and the nice series obtained made up for any disappointment in other respects. It was certainly no easy work to get *B. cinctaria*, but three visits to Holmsley rewarded us with about three dozen specimens. Why this moth refuses to rest on the trees when they grow closely together is incomprehensible to me, but this certainly seems to be the case, for most of the examples taken were on the medium-sized stunted Scotch firs in the most boggy parts of the heath. On one occasion four moths were found on one tree, and this after more than an hour's searching without finding one. The darker-coloured moths seem to be the best protected, the light ones being frequently discernible at a considerable distance. About three-fourths of the moths taken were males. Some of the females were kept in chip-boxes, and deposited their eggs beneath the rough wood of the box, or between the rim of the lid and the outside of the box. In a natural state one would suppose that the ova are deposited in the crevices of the bark of the fir-trunks. Has it been observed whether they are deposited thus or on the food-plant? Besides the Holmsley specimens, two males were taken not far from Denny Lodge, one from a birch trunk.

Two examples of a *Tephrosia*, which I suppose would be *T. crepuscularia*, were taken from fir trunks. *Ematurga atomaria* and *Bupalus piniaria* were just coming out, and *Bapta taminata (bimaculata)* and *Panagra petrarum* were taken singly, whilst a few fine examples of *Anticlea nigrofasciaria* were also obtained. Five species of *Eupithecia* were noted. Two nice specimens of the pretty and local *E. irriguata* were the best. *E. abbreviata* was common almost everywhere. *E. pumilata* was also fairly common, whilst *E. coronata* and *E. nanata* were each singly represented, the former being taken in the 'Rose and Crown' bus. *Xylina socia* was taken from a post. *Xylocampa lithoriza* was in fair numbers, but poor condition.

Turning to the larvæ, my father worked pretty hard with the beating-stick, and met with a fair amount of success, the following being obtained:—*Gnophria quadra* (two, very small), *Nola strigula* (one), *N. cucullatella*, *Halias bicolorana* (two), *Bombyx quercus* (one), *Porthesia similis*, *Miselia oxyacanthæ* (the commonest larva), *Catocala sponsa* (one), *Triphæna jimbria* (?), *Metrocampa margaritaria*, *Ellopiæ fasciaria (prosapiaria)*, *Thera variata*, *T. firmata* (?), *Oporabia dilutata*, *Rumia cratægata*, *Scodonia belgiaria* (?), *Cleora lichenaria* (about two dozen, some nearly full-grown). On the last morning a long search for the larva of *Limenitis sibylla* was well rewarded, as we took twenty-nine between us. The small brown larva was discovered on the brown stick of the honeysuckle just below the green shoot, generally rather low down in the bush in sheltered positions. Mr. Lucas found two on the green leaves, where they are fairly conspicuous, but on the brown stick they were splendidly protected.

It was rather early for dragonflies, but three female *Pyrrosoma nymphula* were observed, and also a quite freshly emerged *Libellula*

depressa, resting on a grass-stem with the old nymph-case just below it. The nymphs of this species were in some numbers in the same pond.

A few Coleoptera were taken at odd moments, and Mr. S. W. Kemp kindly sent me the following list of species obtained:—*Pterostichus striola* (F.), *Dromius quadrimaculatus* (L.), *Deronectes depressus* (F.), *Staphylinus cæ sareus* (Cever.), found under stones and turf, *Anatis ocellata* (L.), *Coccinella septempunctata* (L.), *Byrrhus pilula* (L.), *Rhagium bifasciatum* (F.), *Helops striatus* (Fourc.), *Sceyninus suturalis* (Thunb.), *Hylobius abietis* (L.), *Rhynchites æneo-irreus* (Marsh.), *R. paucivillus* (Germ.), *Apion miniatum* (Germ.), *Balaninus villosus* (F.), and *Geotrupes typhaeus* (L.).

Cicindela campestris was seen commonly on the heaths, flying and running in the sunshine. Two species of Hemiptera also sent to Mr. Kemp were identified by him as *Podisus luridus* and *Acanthosoma griseum*.—F. M. B. CARR; 46, Handen Road, Lee, S.E., May 6th, 1902.

SPHINX CONVULVULI IN 1901.—In the 'Entomologist' for August, 1901, I recorded that Mr. Pestell, of Elstow, near Bedford, captured four specimens of *S. convolvuli* at honeysuckle on June 30th and July 2nd, 10th, and 11th. Mr. Pestell received from field-labourers two larvæ of *S. convolvuli* on August 16th, which pupated on August 22nd; one on August 28th, which pupated on September 2nd; two larvæ on September 7th, which pupated on 12th; one on September 14th, which pupated on the 16th. All these larvæ were found feeding on the scarlet runner, or french-bean. On October 4th he received a pupa which was found in a potato patch. These pupæ all failed to emerge, and are now dead. It appears to me to be probable that the specimens caught at midsummer were hybernated, and that these laid the eggs which produced the larvæ found in August and September.—W. GIFFORD NASH; Bedford.

SPHINX CONVULVULI ON DARTMOOR IN 1901.—At Yelverton, South Devon, at an elevation of about 800 feet, on the edge of Dartmoor, I captured, at tobacco flowers, two specimens of *S. convolvuli* on August 20th, two on 25th, one on 26th, and one on 28th. Many specimens were seen by others after I left the neighbourhood on August 31st.—W. GIFFORD NASH; Bedford.

NOTODONTA CARMELITA IN SOUTH OF SCOTLAND.—I was greatly surprised to find on April 19th last that a female specimen of *N. carmelita* had emerged in one of my breeding pots, which contained pupæ from larvæ collected in this locality during the last week in July and first week in August, 1901. The larvæ were collected from birch and black poplar. I knew that I had *dictæa*, *dictæoides*, *dromedarius*, and *ziczac* among those larvæ, but never suspected that I had *carmelita*.—J. C. HAGGART; Galashiels, N.B., May 3rd, 1902.

PLUSIA MONETA LARVÆ AT FARNBOROUGH (KENT) AND NEIGHBOURHOOD.—Last season I had the good fortune to capture some imagines of this species at Bromley Common (*ante*, Entom. July, 1901). There is a considerable quantity of its food-plant in the neighbourhood (*Aconitum* and *Delphinium*), so this year I resolved to look for the larvæ. A diligent search (mostly on private ground) resulted in the capture of a good number, spun up in bunches of terminal leaves, undergoing

their last moult. A friend of mine has also found two in his garden at Tooting, S.W.—A. J. LAWRENCE; 65, Malyon Road, Ladywell, S.E., May 19th, 1902.

LARVÆ IN DURHAM.—This year has been one of the most successful years for larvæ I have had. We have taken within a very few miles of Newcastle-on-Tyne about fifty larvæ of *Triphana fimbria*, one hundred of *Argynnis euphrosyne*, eighty of *Eupithecia tenuiata*, and one of *A. selene*. These figures are rather remarkable, for the local records say that *A. euphrosyne* is disappearing from this district, and similarly with *A. selene*. We obtained larvæ of the two Argynnis mentioned in about two hours, for we only sought one day.—J. W. HARRISON; 1, Craig Street, Birtley, R.S.O., Durham, May 19th, 1902.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—April 16th, 1902.—The Rev. Canon Fowler, M.A., D.Sc., F.L.S., President, in the chair.—Mr. James Roland Charnley, of Howick House, Howick, near Preston, Lancashire; and Mr. A. T. Gillanders, of Park Cottage, Alnwick, were elected Fellows of the Society.—Mr. O. E. Janson exhibited specimens of both sexes of *Ornithoptera victoriæ*, from Ysabel, Solomon Islands, recently taken by Mr. Albert Meek; and remarked on the variation in the colour and markings in the males.—Mr. H. W. Sheppard-Walwyn exhibited variations of *Euchelia jacobæ* taken by him at Winchester in July, 1889.—Mr. Willoughby Gardner exhibited *Calioxys mandibularis*, Nyl., from the Cheshire coast, a species new to Britain; and *Osmia xanthomelana*, male and female, and *Osmia parietina*, Curt., male and female, from North Wales.—Mr. A. J. Chitty exhibited a specimen of *Aglais urticae* taken at sallow on March 28th, having a large portion of the hind wings cut off, so that when folded they were symmetrical in outline. From their appearance he concluded they had been bitten off by some animal, probably during hybernation.—Dr. T. A. Chapman called attention to the remarkable bilateral asymmetry in the male appendages of the Hemarid Sphinx, *Cephonodus hylas*, Linn. He said that bilateral asymmetry in insects was sufficiently rare to make it always notable. In the male apophyses of Lepidoptera he had only been able to find records in the case of the Hesperid genus *Thanaos*, to which Scudder and Burgess first called attention—though it seems highly probable that the facts can hardly have been unobserved in so common a species as *C. hylas*. In *hylas* the right clasp is larger, rounded, but very imperfectly articulated to the base, so as to be capable of very little movement, otherwise, and compared with other Hemarid genitalia, one would call this the normal clasp. The left clasp looks at first as though it had been the same as the right, but had met with some accident that had removed a large terminal disc, leaving two lateral cusps. It is shorter than the right as about three to five, and the arrangement of bristles and spines is quite different to that on the right, if it is indeed possible to compare these very different forms. It is much more movable than the right clasp. The arrangement suggests that it is intended to

facilitate a lateral, instead of a medial approach in the capture of the female. The upper appendage or tegument is also twisted, so as no doubt to correspond with the obliqueness of the whole appendage, as most definitely seen in the clasps. Dr. Chapman also exhibited specimens removed from the insect, and also of the several parts, as well as a rough sketch of the clasps and tegumen.—Mr. C. P. Pickett exhibited *Hybernia leucophaëaria* taken during March at Chingford, Highgate, and Finchley, including the ordinary mottled, the black and white banded, and six very deep chocolate-coloured forms, one unicolorous. He also showed series of *Phigalia pedaria*, *Anisopteryx æscularia*, and *Nyssia hispidaria*, from the North Metropolitan district.—Mr. H. J. Turner, on behalf of Mr. W. West, of Greenwich, exhibited specimens, males and females of *Stictocoris flaveola*, Bohm., a species new to the British fauna, found amongst long grass in damp places at Lee, Kidbrook, and Shooter's Hill. He also exhibited several specimens of *Typhlocyba candidula*, Kir., a species first discovered by Mr. West at Lewisham and Blackheath on *Populus alba*, and remarked that it was interesting to find two quite new species occurring in the district so well worked by Douglas and others in years past.—Dr. D. Sharp, F.R.S., communicated a paper by Miss Alice L. Embleton, B.Sc., entitled "On the Economic Importance of the Parasites of Coccidæ."—Colonel Charles Swinhoe, M.A., F.L.S., read a paper entitled "Eastern and Australian Drepanulidæ, Epiplemidæ, Microniidæ, and Geometridæ in the British Museum Collection." Mr. William F. Kirby, F.L.S., contributed a paper entitled "Additional Notes on Mr. Distant's Collection of African Locustidæ."—H. ROWLAND-BROWN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 27th*, 1902.—Mr. F. Noad Clark, President, in the chair.—Mr. Stanley Edwards exhibited (1) very fine specimens of Ornithoptera, *O. bormanni*, *O. naias*, and *O. criton*, from the Malay Peninsula, and a male of the rare *O. plateni*, from New Guinea; also a large collection of Hemiptera-Heteroptera from all parts of the world, comprising seventeen genera and eighty-five species.

April 10th.—The President in the chair.—Mr. Main exhibited a twig of hawthorn from the New Forest, having a large batch of ova of *Eriogaster lanestris*, and remarked on the curious spiral arrangement of the eggs.—The Rev. F. P. Perry, a large number of specimens collected during a short residence in South Africa, including a large and conspicuous ant-lion, several species of cockroach, clusters of *Mantis* eggs from the gum-trees, numerous species of Coleoptera—especially Longicorns—and a very large species of the Hemiptera. He specially pointed out a large beetle which had powerful stridulatory organs at the back of the pronotum.—Mr. Moore, some ten species of exotic Blattodea, including *Blabera gigantea*.—Mr. Kemp, a macropterous example of *Hydrometra stagnorum* from Mitcham.—Mr. Hewitt and Mr. Nottle, long bred series of *Nyssia hispidaria* and *Amphidasys strataria*, both from Epping Forest parents; and a number of *Phigalia pedaria* from West Wickham.—Mr. Edwards, a collection of Hemiptera-Heteroptera mainly from South America, and a number of species of the genus *Charaxes*, including several fine examples of *C. jasius*.—Mr.

Lucas, specimens of *Eriocrania subpurpurella*, which he stated was now common at Oxshott on fences.—Mr. Clark, microscopic slides showing details of structure of *Corixa striata*, *Orygia antiqua*, &c.—Dr. Chapman, specimens of *Ræserstanmia ercebella* bred from larvæ beaten by Mr. F. M. B. Carr at Oxshott on birch; he also gave notes on its habits and occurrence, and made remarks on the spelling of its specific name.—Mr. South, a curious banded form of *Acidalia marginepunctata*, from the hills round Clevedon, and a large number of species of British and Eastern Asian Lepidoptera, the latter to illustrate his paper entitled “Some British species of Lepidoptera and their Geographical Distribution.”—HY. J. TURNER, *Hon. Rep. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY. — April 21st. — Mr. G. T. Bethune-Baker, Vice-President, in the chair.—Mr. R. C. Bradley showed the following species of Aculeate Hymenoptera from Wyre Forest:—*Pompilus cinctellus*, *Agonia hircana*, *Pseudagenia punctum*, and *Stelis aterrima*, all being new to the district.—Mr. C. J. Wainwright, a small collection of Diptera made by Dr. T. A. Chapman in Spain last year, chiefly in the Sierra Albarracin. Amongst the most interesting were *Volucella elegans* (originally described from Spain), *Physocephala chrysorrhæa*, *Anthrax velutina*, *Systæchus leucophæus*, *Holopogon clavipes*, *Cyrtus gibbus*, and a series of a species of Tachinid of the *Plagia* group, which had been bred from *Albarracina korbi*, and appears to be quite new and very distinct.—Mr. W. H. Flint, a long series of *Brephos notha*, taken in the Forest of Dean last Easter Tuesday. The species was quite common, flying chiefly round the aspens, and he noticed that they did not appear to come to sallow blossom at all as *B. parthenias* does.—Mr. Bethune-Baker, a number of Lycænidæ from South Africa, of unusual colours and patterns for the family.—Mr. W. H. Flint gave an account of the wings of Lepidoptera, their structure, development, &c.

CORRECTION.—The *Apamea testacea* mentioned in last report (*ante*, p. 150) were from Moseley, and not from Wyre Forest as there stated in error.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — The usual monthly meeting was held on April 14th, in the Royal Institution. Dr. J. W. Ellis, F.E.S., occupied the chair.—The following gentlemen were elected members of the Society:—Mr. Hy. Champ (Manchester), Mr. Benjamin Jones (Levenshulme), Mr. W. Raepier (Levenshulme), and Mr. J. T. Wardley (Knotty Ash). Mr. R. Wilding proposed that the evening meetings be adjourned until October next; Mr. Webster seconded, and it was carried.—Mr. Wilding further proposed that a field meeting be held in the summer, the arrangements to be made by the secretaries; Mr. Pierce seconded, and it was carried unanimously. Mr. F. N. Pierce, F.E.S., read a paper on the British Pulicidæ, which was communicated by Mr. G. C. Bignell, F.E.S., and was well illustrated by the micro-lantern.—The following exhibits were examined:—A small collection of Coccidæ, by Mr. R. Newstead; micro-slides of Pulicidæ, by Mr. Pierce; *Biston hirtaria*, by Mr. W. A. Tyerman; Coleoptera from Mossley Hill, by Mr. G. A. Dunlop; Coleoptera, including species new to the district, by Mr. Wilding; and *Cymatophora flavicornis* mounted in the natural position on a branch of the food-plant (*Betula alba*), by Mr. Fred. Birch.—FRED. BIRCH, *Joint Hon. Sec.*

RECENT LITERATURE.

H. KOLBE, "Gartenfeinde und Gartenfreunde, die für den Gartenbau schädlichen und nützlichen Lebewesen." Gartenbau Bibliothek, Band 34-36; pp. 1-320, and 76 text figures. Karl Siegismund, Berlin (preface dated June, 1901).

THIS useful little book may be compared best, perhaps, with Dr. John B. Smith's 'Economic Entomology' (1896). The arrangement, however, is quite different, the present work discussing the pests under the heading of their food-plants, instead of in systematic order.

After an introduction upon the structure of the insect frame, and an account of the principal economic orders and families, with analytical tables for their further identification, preventive measures and remedies are briefly discussed. The more important plants are next considered, with an account under each of their various pests, *viz.* divers fruit-trees, strawberries, vegetables, and ornamental shrubs; a considerable amount of otherwise scattered information is here gathered together. The second part deals with the gardener's friends—beasts, birds, ichneumon-flies and others.

The author's name is a guarantee of the accuracy of the entomology, while the illustrations, most of which are from the pencil of Dr. Rübsaamen, are clear and well-selected. The book is plainly but substantially "got up," and the printing (which is in the German character) is wonderfully clear.

G. W. K.

A. D. MICHAEL, "British Tyroglyphidæ," vol. i. pp. v and 291; 19 partly coloured plates (Ray Society, 1901).

A COMPANION volume to the author's "Oribatidæ," and deals with the Acari of which the "Cheesemites" are the type.

This first volume contains a history of the literature; criticism on recent classifications of the Acarina; followed by detailed accounts of the anatomy and development, and a systematic account of a portion of the family. In the forthcoming second volume we are promised the continuation of the systematic account and a bibliography of the literature.

Although so minute—one thirtieth of an inch being the length of a very large species—the Tyroglyphidæ are of considerable importance. The number of known species is very few, some fifty being recognized, and these mostly very widely distributed; yet many of them "swarm in such countless myriads . . . that the mind shrinks from any attempt to estimate their numbers, even in a small space." They are enormously destructive to cheese, flour, hay, and druggists' stores; sound healthy bulbs as well as rotten ones, and dried fruits, attest their ravaging powers. Biologically, however, the Tyroglyphidæ are specially remarkable for the possession of a "*Hypopus*-stage." The "*Hypopi*" are heteromorphous—comparatively rarely occurring—nymphs (of both sexes) which are not true parasites, but only attach themselves to any suitable moving creature for purposes of transit. This *Hypopus*-stage was for long an enigma, but was elucidated by the author in 1885, and is now fully discussed in the sixth chapter. We must not omit mention of the nineteen plates containing 241 beautiful drawings by the author, of which forty-five are coloured. They are beyond all praise.

G. W. K.

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[No. 470.

ADDITIONS TO THE FAUNA OF MEXICO (BEES AND COCCIDÆ).

By T. D. A. COCKERELL.

PROF. C. H. T. TOWNSEND has this year been exploring parts of the State of Chihuahua, and has brought to light the following forms, new to the Mexican fauna.

APOIDEA.

Melissodes tristis malvina, n. subsp.—♂. Similar to *M. tristis*, but smaller (length about $8\frac{1}{2}$ mm.); eyes dark brown (pale greenish or greyish in *tristis*); antennæ with the flagellum dark reddish beneath (bright ferruginous in *tristis*); nervures of wings mostly piceous (ferruginous in *tristis*); pygidial plate narrower; otherwise as in *tristis*. The clypeus, labrum, and mandibles are black, as in *tristis*.

Hab. Cerro Chilicote, State of Chihuahua, Mexico, at mouth of cañon on south side, March 22nd, 1902, at flowers of a species of Malvaceæ, apparently one of the purple species of *Sidalcea*. Collected by C. H. T. Townsend.

The following table separates the males of *Melissodes* in which the clypeus is black:—

- | | |
|---|-----------------------------|
| Antennæ reaching far beyond thorax | 1. |
| Antennæ not reaching beyond thorax | 3. |
| 1. Mesothorax with much black hair. (Calif.) | <i>personatella</i> , Ckll. |
| Mesothorax without black hair | 2. |
| 2. Larger, length about 10 mm. (New Mexico) | <i>tristis</i> , Ckll. |
| Smaller, length about $8\frac{1}{2}$ mm.; differing also as described above | <i>malvina</i> , Ckll. |
| 3. Antennæ scarcely reaching to scutellum; abdomen without bands. (Texas) | <i>intorta</i> , Cr. |
| Antennæ reaching to metathorax; abdomen banded | 4. |
| 4. Antennæ black, mandibles without a yellow spot. (Oaxaca, Mexico) | <i>assimilis</i> , Sm. |
| Flagellum bright ferruginous beneath, mandibles with a large yellow spot. (Sta. Fé, New Mexico) | <i>sphæralcea</i> , Ckll. |

Agapostemon texanus, Cresson.—♀. Bluer than usual. Cerro Chilicote, April 3rd, on flowers of some species of *Compositæ* (Townsend). Although this species is now first recorded from Mexico, its occurrence in the State of Chihuahua could have been predicted with certainty, as it is very common in the adjacent parts of the United States.

COCCIDÆ.

Tachardia cornuta, Ckll.—Cerro Chilicote, at mouth of cañon on south side, March 22nd, on a bushy composite plant called *Salvilla* by the Mexicans (Townsend). The specimens are more irregular than the original types. This makes the sixth lac-insect from Mexico.

Lecaniodiaspis rufescens (Ckll.).—Cerro del Chile, east base in Arroyos, on green spiny shrub, March 26th, 1902 (Townsend).

Eulecanium robinia (Townsend).—Cerro Chilicote, April 10th, on ash (?) and *Rhus* (?). Collected by Townsend. This is a shiny dark ferruginous convex scale; rugose, more or less pitted, and covered with a waxy secretion at the sides. Length 6, breadth 4, height $3\frac{1}{2}$ to 4 mm. I have been doubtful whether to regard it as veritable *robinia*, and conclude for the present to designate it as a new variety—*subsimile*—agreeing with *robinia* in the general form and appearance of the scale, the character of the skin and the dimensions of the legs, but differing in having the antennæ 8-jointed (7-jointed in *robinia*) and the eggs white (pink in *robinia*). The antennæ and legs of *subsimile* measure as follows in μ :—

Antennal joints: (1) 30–36, (2) 30–36, (3) 45–48, (4) 44–48, (5) 18–20, (6) 20–21, (7) 18, (8) 28–30.

Legs: femur and trochanter, 135–138; tibia, 96–102; tarsus, 66–75.

The scale is narrower and more shiny than specimens referred to *E. robinia*, which I lately collected at Tempe, Arizona, on osage-orange. The Tempe insect has the antennæ 7-jointed, measuring as follows:—(1) 33, (2) 30–36, (3) 42, (4) 33–42, (5) 18, (6) 15–16, (7) 30–38.

It seems that *E. robinia* and its varieties (or closely allied species?) are almost certainly natives of the south-west, and are not identical with *E. robiniarum* (Douglas), as has been supposed. The exact classification of these forms is a matter of difficulty; we need more material from different plants and localities, and a knowledge of the early stages and males.

East Las Vegas, New Mexico, U.S.A.
April 17th, 1902.

ON SOME NEW GENERA AND SPECIES OF HYMENOPTERA (ICHNEUMONIDÆ, CHRYSIDIDÆ, FOSSORES, AND APIDÆ).

By P. CAMERON.

ICHNEUMONIDÆ.

(Continued from p. 111.)

HABROJOPPA, gen. nov.

Antennæ dilated and compressed beyond the middle; the apex attenuated. Eyes small, reaching to the middle of the face, the malar space being large; they are parallel on the inner side. Occiput margined. Clypeus not separated from the face by a suture. Labrum hidden. Mandibles with two equal teeth on the apex. Mesonotum reticulated, without furrows. Scutellum stoutly keeled laterally; its apex incised. Median segment reticulated; the basal and central areæ only are defined; the spiracles linear. Areolet much narrowed at the top; the transverse cubital nervures almost meeting there; it is angled below, and receives the recurrent nervure near the middle; the transverse median nervure is received shortly beyond the transverse basal on the outer side. Legs normal; the claws simple. Petiole long and slender, dilated at the apex; the spiracles are placed near the apex of the basal fourth. Gastrocœli large, deep. There are seven segments; the last three are smaller than the others, and form a sharp point; the ovipositor hidden; the ventral fold only extends to the apex of the second segment; the last ventral segment is large, entire, broadly rounded at the apex; its base extends to the base of the penultimate dorsal, and does not extend to the apex of the last dorsal; there are only six ventral segments in the female. The apex of the hinder femora reaches to the base of the fourth segment.

From *Charitojoppa* it may be known by its more slender form, by the scutellum not being pyramidal, by the petiole being more slender, and not broadly dilated at the apex. In the form of the scutellum it more resembles *Magrettia*,* but it wants the coxal spine, the pronotum is not incised behind, and the second and third segments are longitudinally striated; the petiole is more slender towards the apex, and longer, more as in *Ichneumon* than as in *Platyri*.

HABROJOPPA RUFO-PETIOLATA, sp. nov.

Cærulea; abdomine albo annulato, basi rufo; pedibus rufis, tarsis posticis nigris; alis fusco-hyalinis. ♀. Long. 12 mm.

Hab. Khasia (coll. Rothney).

Antennæ black, the eighth to the thirteenth joints white, the apical joints compressed, fuscous. Head shining, blue, the face and

* *Magrettia*, I find, is preoccupied in Orthoptera. I now propose the name of *Xenojoppa* for it.

clypeus sparsely punctured; sparsely covered with short fuscous hair; the inner orbits from near the base to opposite the lower ocellus, a mark on the side of the clypeus, the base of the mandibles broadly, and the palpi yellow. The clypeus not separated from the face by a suture, nor foveate. Mesonotum coarsely reticulated; the sides depressed, crenulated; there is a smooth furrow on either side from nearly opposite the base of the tegulae to the apex. Scutellum smooth, impunctate, its sides keeled; at its base is a large, deep, smooth, slightly curved depression; from shortly behind the middle to near the apex it is pallid yellow. The areola is longer than broad; becomes slightly and gradually wider to beyond the middle, then becomes gradually narrower; its base is rough; in the middle at the apex is a stout longitudinal keel; the posterior median area is stoutly transversely striolated; the spiracular area behind the spiracles is finely rugose, in front of them stoutly transversely striolated. The base of the pronotum has a few curved striae; above, at the apex, it is irregularly stoutly striolated; the lower side is stoutly obliquely striolated; the upper part of the mesopleurae and the apex with a few stout irregular keels; the rest closely and coarsely punctured, almost reticulated; the upper part of the metapleurae at the base coarsely aciculated; the middle at the base with fine stout curved keels; the rest closely and stoutly reticulated. Mesosternum closely punctured; the furrow large, wide and triangular at the apex. Legs ferruginous, the fore coxae paler at the base; the apex of the hinder tibiae and the tarsi black; the latter spinose beneath. The areolet is narrowed at the top, but the nervures do not touch; the recurrent nervure is received almost in the middle of the areolet. The petiole is ferruginous, yellow at the apex, carinate down the middle, and striated on the base of the dilated part; the second, third, and fourth segments are blue; the second and third closely punctured, the others smooth; the second acutely striated in the middle between the gastrocelli, which are striated at the base, their apex smooth and brownish; the apical segments are for the greater part yellowish.

HOLCOJOPPA, gen. nov.

Abdominal segments strongly constricted at the base, and clearly separated; the constrictions deep and closely longitudinally striated; the segments longitudinally striated, and broadly depressed laterally; the petiole raised in the middle, and bearing there two longitudinal keels; there are seven segments; the last is small and has stout cerci. Scutellum conical, large, distinctly raised above the level of the mesonotum; its basal slope is steep, its apical long and gradually sloped from the top to the apex. Post-scutellum smooth, bifoveate at the base, and with a deep depression on either side. The median segment is widely and deeply obliquely depressed at the base; the areola is represented by a smooth tubercle; there are three large areas on the apical slope; the spiracular area being also defined; there are no spines. Wings larger than usual; the apex of the abdomen does not reach to the areolet when folded against it; the areolet is large, five-angled, narrowed above; the two transverse cubital nervures are roundly curved; the transverse median nervure is received beyond the

transverse basal; the wings are yellowish hyaline, with the apices of both infuscated. The hinder legs are much longer than the four anterior; they are longer than the body; the apex of the hinder femora reaches to the apex of the fourth segment; the tarsi are spinose. The head has the vertex depressed between the eyes; it is sharply obliquely narrowed behind them; the face is longish; the malar space is large; the labrum projects. The transverse median nervure is almost interstitial; there is the stump of a nervure on the disco-cubital nervure; the transverse cubital nervure in the hind wing is broken far below the middle; the lower part of the metapleuræ is bounded by a keel, and there is a stouter curved keel below the middle; the gastrocœli are deep, narrow; the ventral keel extends to the end of the third segment; the antennæ in the male are slightly serrate.

A distinct genus, easily known by the constricted segments of the abdomen separated by deep furrows.

HOLCOJOPPA FLAVIPENNIS, sp. nov.

Lutea, flagello antennarum tarsisque posticis nigris; alis flavo-hyalinis, apice nigris, stigmatæ testaceo. ♂. Long. 14–15 mm.

Hab. Khasia (coll. Rothney).

Uniformly rufo-luteous; the inner orbits, the fore legs in front, the three divisions of the pleuræ behind, and the petiole broadly at the base, more or less yellowish. The scape of the antennæ rufous, punctured, thickly covered with short fuscous hair; the base of the flagellum dull rufous, the rest blackish. Head somewhat triangular behind, being narrowed to a rounded point in the middle; the face roundly projecting in the middle, and obscurely punctured; the sides flat, yellowish, impunctate; the clypeus obscurely punctured; the apex obliquely depressed; the mandibles pale yellowish; the teeth black; the palpi rufo-testaceous. Thorax ferruginous above; the sides paler, having a yellowish tinge; thickly covered with short hair, dark on the mesonotum, paler on the pleuræ. The roundly pyramidal scutellum shining, rather thickly covered with longish fuscous hairs, and bearing all over large deep, not very widely separated, punctures; the post-scutellum small, not very distinct; the space on either side of it depressed, wide, smooth, and having a few stout irregular keels. The base of the median segment widely separated from the post-scutellum, raised to nearly the level of the top of the scutellum; without any defined area, but with two stout straight keels going down the centre, which is coarsely irregularly transversely striolated; the sides rugosely irregularly reticulated. Propleuræ closely punctured above, yellowish and impunctate below; the upper half of the mesopleuræ shining, impunctate; the middle with a wide shallow longitudinal depression down the centre; the lower half closely punctured, and of a yellowish hue at the base and apex; the metapleuræ with a wide oblique depression on the base at the top; over the sternum is a wide shallow furrow, bearing stout widely separated, slightly oblique keels. Legs rufo-testaceous; the apex of the hinder tibiæ and the tarsi blackish; the fore legs of a paler, more yellowish hue, and thickly covered with short white hair; the hair on the hinder tibiæ and tarsi blacker.

Wings yellowish hyaline, the apices blackish ; the areolet narrowed at the top ; the first cubital nervure slightly, the second distinctly, roundly curved, the two almost uniting at the top ; the recurrent nervure is received almost in the middle. The basal half of the petiole greatly narrowed, yellowish ; the apical with two stout keels down the middle, and coarsely punctured ; the other segments coarsely rugosely punctured, striolated at the base down the centre ; all the segments separated by a deep moderately wide depression ; the ventral surface whitish.

CRYPTINA.

OSPRYNCHOTUS PERONATUS, sp. nov.

Niger, tegulis, apice scutelli, post-scutello, maculis 3 metanoti, ore orbitisque oculorum flavis ; pedibus flavis ; coxis, trochanteribus, femorum posticorum dimidio apicali apiceque tibiæ posticarum nigris. ♀ et ♂. Long. 16, terebra 6 mm.

Hab. Khasia (coll. Rothney).

Antennæ black ; the tenth to fifteenth joints white, stout ; the scape yellow beneath, and covered with short white hair. Head black ; the face, except for a conical mark in the middle under the antennæ, the clypeus, labrum, the inner orbits above, and the outer more broadly below, and the palpi, yellow ; the clypeus is edged with black at the sides and apex ; the mandibles are entirely black. The face is closely, the clypeus more coarsely and not so closely punctured. Vertex strongly punctured, and with a few oblique striæ below the ocelli ; the front depressed, at the sides very smooth and shining. Thorax black ; a broad line on either side of the base above, the tegulæ, scutellum, except at the base, the post-scutellum, the scutellar keels, the apex of the median segment at the base and sides, the base more narrowly than the sides, where the yellow is dilated broadly outwardly, and a somewhat oval mark immediately under the hind wings, yellow. Mesonotum closely and strongly punctured, thickly covered with short white hair ; its middle lobe is distinctly raised at the base ; the scutellum shining and thickly covered with long white hair, and sparsely punctured ; the punctures are large, round, and shallow ; the post-scutellum is almost impunctate ; its base is deeply bifoveate ; the depression at the sides is not striated, and is covered with long white hair. The median segment, at the base behind the transverse keel, is closely punctured ; the punctuation is stronger towards the apex, in the middle of which is a stout short semicircular keel ; in front of the keel the segment is coarsely punctured, rugosely so at the apex, which has a slight oblique slope ; its sides and top are bordered by a stout keel ; the black mark in the middle is rounded at the base, transverse at the apex, and twice longer than broad. Pro- and mesopleuræ closely punctured ; the lower part of the former with some stout longitudinal keels at the apex ; the metapleuræ more strongly punctured ; the punctures run into reticulations, and are stronger on the lower side ; over the hinder coxæ is a large yellow mark, twice longer than broad, and rounded and narrowed at the top. Wings hyaline, the apex smoky ; the stigma and nervures black ; the areolet is a little longer than wide, slightly narrower at the top than at the bottom ; the recurrent nervure is received shortly beyond the middle ; the second transverse cubital

nervure is bullated on the lower side, but not strongly. Legs fulvous; all the coxæ and trochanters, almost the apical half of the hinder femora, and the apical third of the posterior tibiæ, black; the hinder tarsi have a more yellowish paler hue, and are black at the base. Abdomen black and shining: all the segments are banded with yellow at the apex; the ventral surface, except the petiole, pale yellow.

This is an *Osprynchotus*, Spin., sec. Ashmead, non Kriechbaumer, which equals *Linoceras*, Tasch. The genus is new for the Indian fauna.

(To be continued.)

NOTES ON NEUROPTERA OF OXON AND BERKS.

By W. J. LUCAS, B.A., F.E.S.

RECENTLY I received for inspection from Messrs. W. Holland and A. H. Hamm a box of Neuroptera (other than Odonata) collected in Berks and Oxon. Insects of this order are so seldom recorded that the list will probably prove of interest to those who are working at them. I have to thank Mr. C. A. Briggs for assisting very greatly in naming the specimens, especially the more obscure ones.

OXON.

EPEMERIDIA.—*Ephemera vulgata*, Thames side near Binsey, and canal side north of Oxford. *Cloëon rufulum*, Oxford. *Centroptilum luteolum*, Godstow and Oxford.

PLANIPENNIA.—*Sialis lutaria*, canal side north of Oxford, and Thames side at Binsey. *Raphidia xanthostigma*, Shotover Hill (May 28th). *Sisyrufusca*, Thames side at Binsey (May 29th). *Chrysopa flava*, University Park, Oxford. *C. vulgaris*, taken in the Museum, Oxford (Mar. 28th). *C. perla*, near Oxford. *Panorpa germanica*, Stow Wood.

TRICHOPTERA.—*Phryganea striata*, Charlbury, Wychwood Forest. *Limnophilus lunatus*, Oxford. *Anabolia nervosa*, Oxford. *Notodobia ciliaris*, canal side north of Oxford (May 26th); not a common species. *Leptocerus cinereus*, Thames side at Binsey. *Mystacides nigra* (McLach., Trich. Eur.), canal side north of Oxford. *M. azurea* (McLach., Trich. Eur.), Thames side at Binsey.

BERKS.

EPEMERIDIA.—*Ephemera vulgata*, Thames side above Godstow, and Reading. *E. danica*, Reading. *Leptophlebia marginata*, Thames side above Godstow (June 1st), and Wellington College, near Reading (April 22nd.) *Centroptilum pennulatum*, Thames side near Oxford (May 27th). *Ecdyurus volitans*, Thames side above Godstow (June 1st, 1901); an interesting capture.

PLANIPENNIA.—*Sialis lutaria*, Thames side above Godstow. *Raphidia notata*, Wokingham, near Reading. *Sisyra fuscata*, Thames side above Godstow (June 1st). *Hemerobius stigma*, Wellington College. *Chrysopa vulgaris*, Wellington College. *C. septempunctata*, Ferry Hinecksey. *C. ventralis*, Tubney Wood, and Wokingham. *C. perla*, Thames side near Kennington. *Panorpa communis*, Tubney Wood, and East Ilsley. *P. germanica*, Tubney Wood, Thames side above Godstow, and Boar's Hill, near Oxford.

TRICHOPTERA.—*Phrygania striata*, Reading. *Colpotaulius incisus*, Thames side above Godstow. *Grammotaulius atomarius*, Reading. *Limnophilus rhombicus*, Reading. *Notidobia ciliaris*, Thames side above Godstow (June 1st). *Goëra pilosa*, Thames side above Godstow. *Leptocerus annulicornis*, Thames side above Godstow (June 1st). *Mystacides nigra*, Thames side above Godstow, and the Kennet, Reading. *Neuroclipsis bimaculata*, Reading. *Tinodes weneri*, Thames side above Godstow. *Lype phæopa*, the Kennet, Reading. *Glossoma boltoni*, Thames side above Godstow.

CONTRIBUTION TO THE LIFE-HISTORY OF *LIPHYRA BRASSOLIS*, WESTW.

By F. P. DODD.

(Concluded from p. 156.)

The perfect insect comes forth in twenty-one to twenty-five days, and further astonishing developments in the life-history of this strange insect occur. Before bursting the outer shell the butterfly can be heard moving within, and shortly a sharp cracking sound announces that the burst has been effected, then either a portion of the shell, which opens in the centre in front up to the first furrow, is broken right out, or it opens sufficiently above after breaking away at the rim to admit of the imago's emergence. But who would recognize *L. brassolis* now as he crawls out? Instead of the weak drooping wings of a butterfly, he has little short appendages like a freshly-emerged moth, and lying very flat; the front wing is creamy white to extreme tip, and the edge of the hind wing projects from under this ever so little; the abdomen looks very large, a thick mass of furry-looking substance showing on each side of it to the tip; on the thorax small tufts of loose brownish scales may be noted, which easily roll off. It is soon seen that the white appearance of fore wing is caused by a dense covering of fugitive scales; there is also a small patch on each side of thorax. As the wings slowly lengthen, the density of the scales lessens sufficiently to admit of a view of the black and rich yellow colouring underneath.

These white scales fly off after expansion of wings at the least breath of air; they are blown away much more easily than the scales on our clearwinged hawks (*Hemaris kingii*, *hylas*, and *janus*). A stroke or two of the insect's wings detaches everyone in a cloud; therefore it is a difficult matter to kill and set specimens and leave a fair proportion of these scales. The matter on the abdomen is of course also composed of scales; they are dark grey, packed very densely, and cover about half of ventral surface, reach further along the sides, but do not reach the thorax, none being on the upper surface. These are much more adhesive, and must be scraped away, as they cannot be blown off; they come away in masses, and fasten lightly to anything they come in contact with, and appear to be held together. Upon examining them with a lens, exceedingly delicate threads can be discerned dispersed throughout. The legs and antennæ are also clothed with minute and easily detachable white scales.

The insect requires longer than the largest Australian moths to pump its wings to their full length. The wings of even the gigantic *Zeuseridæ* attain their full proportions in fifteen or twenty minutes, and I have seen a five-inch hepialid expand the wings in seven minutes; but our butterfly requires twenty-five to thirty minutes, and instead of being prepared for flight in a little over an hour, like the *Antheræa* and many other large moths, is quite helpless for a much longer period, and none of my specimens exhibited the least desire to fly in three or even four hours. The great *Ornithoptera cassandra* flies in a comparatively short time.

The butterflies are very oily; in some instances grease came through abdomen in less than a week after setting. A thick layer of almost liquid grease lines the abdomen, so it was necessary to resort to stuffing the insects; unfortunately this operation causes displacement of the extra scales to some extent, especially in the male.

As to the butterfly being crepuscular in its habits, I may mention that I am frequently out in the twilight, but have not met with it; that may be on account of its rarity. However, they are decidedly wideawake in the daytime. I have captured several which I had disturbed as any ordinary butterfly would be disturbed. Several times they have flown from near ant-nests which I was about to examine; one specimen was seen flying across an open space in the early afternoon, and had evidently come from a fair distance, as there were no green ants in the vicinity. Many years ago I caught my first specimen, a female, on a hot summer day about eleven o'clock. It flew rapidly across a scrub and settled on a branch under the foliage, precisely as the egg-depositing female did which I observed in July, 1900.

Now, concerning the loose scales on this unique butterfly, we have no evidence that the larvæ are welcome inhabitants of the ants' nests. However, it is highly probable that the ants have no friendly feeling for the perfect insect, and would most likely attack and kill it during its long rest after emergence if it were not specially and wonderfully protected. So it will be seen that the loose scales act as a perfect protection, for directly the ants encounter these they are in trouble; they fasten on to their feet and impede their movements, or, if their antennæ or mandibles come in contact with any part of the butterfly, the scales adhere thereto, so that the ant is soon in a bad way, and has quite enough to do in attempting to free himself of his encumbrances without taking any further interest in the butterfly, from which he retreats as well as possible. It is exceedingly ludicrous to observe the ants endeavouring to free themselves; their legs move awkwardly, and their mandibles are opened and closed in evident annoyance and perplexity, and they are much concerned at the state of their antennæ, for the obnoxious scales will not be shaken off, and they seem to become very low-spirited.

It is amusing to observe this dejected change in an ant after his first spar with *L. brassolis*, for he is such a pert pugnacious fellow, and perfectly willing to tackle anything that moves if in proximity to his pets or nest. As mentioned, I had several small nests of ants taken home, and could introduce them to the butterfly as I wished. It would doubtless be highly entertaining to watch a numerous colony of ants making the acquaintance of a freshly-emerged butterfly.

The small wings of the insect enable it to get through the nest entrances. The scales on fore wing are necessary to his safety whilst he is crawling out, for the ants might in some cases evade his legs and get on to the thorax; but if the scales there did not vanquish him, those on the fore wing would. As the butterfly's abdomen becomes strong enough, he raises the tip to touch the support where he is hanging; in that position he is invulnerable, hundreds of ants could not hurt him. As the fore wings lengthen and touch there is no further need of the scales thereon. The wind doubtless dislodges the majority before the insect flies off, but the other scales would not disappear wholly for some time.

I placed four larvæ on a nest where I knew there were none, and afterwards visited it, and obtained two pupæ therefrom. Upon another small tree with several ant habitations, seven larvæ were placed, and going there some days later I found one chrysalis on the outside of a nest, one within, several attenuated larvæ wandering about the tree—the ants, having become familiar with their presence, taking no notice of them—and a dead larva on the ground. It would appear that the entrances to the nests were too small for the larger caterpillars to gain

admittance. Once I saw a larva on the outside of a new nest, and I took a pupa on another; these were in localities where I had not interfered with the ants. These instances serve to show that the larvæ pass from one domicile to another, presumably when their pabulum is exhausted in one. They are very slow moving, and when they find it necessary to change quarters, they must wander after sundown, for out of over eighty larvæ and pupæ which passed through my hands not a single example was parasitised; but the other Lycænids I have mentioned, though seemingly always accompanied by a number of ants, in both larval and pupal stages, are frequently victimised by Diptera and ichneumons; but these species do not live in the ant nests, and being day feeders (I don't know about night), numbers are stung.

The larvæ of *L. brassolis* are evidently so tough-skinned that the mandibles of the ants can make little or no impression upon them, for in placing specimens upon a nest, the inmates rush out at them, catch hold of the caterpillar rim, and appear to be acting most viciously. They also endeavour to reach the head or legs, but these are at once protected, the creature just lowers its great sides and is secure. After examining caterpillars which have been on nests for several hours, and tugged at and nipped by dozens of ants, not a mark or wound was discernible; yet, if the slightest cut is made in the rim with a knife, juices issue as from any ordinary caterpillar with an opening in the skin.

In conclusion, I may mention that it is not all pleasure searching for *L. brassolis*, or other insects, in the habitations of the green ants. This species is as plucky and determined as the fierce and dreaded "bulldog" and "jumper" ants, and come trooping in hundreds from all parts of the tree when a nest is disturbed. Then there is the multitude in the nest itself, also those in other nests, for often there are many in even a small tree. They are remarkably quick to get upon and spread themselves over an intruder, and do not waste their energies in biting one's clothing; but directly they reach the flesh they commence operations, and one's neck and arms suffer considerably. The bite of the insect is trifling, but he discharges a liquid on to the bitten spot, which gives sharp pain. In approaching closely to an ants' nest, or where they are in attendance upon scales, aphides, or other insects, they show fight unmistakably. Whilst they are prancing and plainly showing that they are desirous of a closer acquaintanceship, it will be noticed that the abdomens are held up and occasionally jerked forward; this jerking action means that the insect has brought his little "squirt" into play, a jet of decidedly acrid liquid being discharged therefrom, sent straight over his head, and capable of striking an object several inches direct in front before it assumes a downward tendency. Having received several of these jets, or part of them, in the

eyes, on the lips, and often had the liquid in cuts or scratches, I can testify as to its stinging properties. When hundreds of ants are sending forth these jets, which can be seen against the sun, it behoves one to be careful when in their immediate vicinity. We have many interesting species in Queensland, but this green tree insect, with his vast colonies, strangely used larvæ, and queer and varied acquaintances, is the most remarkable of all.

Warburton Street, Townsville, Queensland.

A LIST OF TORTRICES TAKEN IN SOUTH ESSEX BETWEEN 1885 AND 1901.

By A. THURNALL.

(Continued from p. 169.)

Grapholitha cinerana, Haw.—Considered by many to be a var. of *nisella*. I have not met with it, but, if I am not mistaken, Mr. Harwood told me once that he takes it near Colchester.

G. nigromaculana.—Somewhat local, but usually common (sometimes very common) where it occurs, amongst *Senecio jacobaea*, on the seeds of which plant the larva feeds in September. I once bred a specimen, which did not emerge till the second season after spinning up. Near Harold Wood, Witham, Upminster, &c.

G. campoliliana, Tr.—Generally distributed amongst willow, from which it may be beaten in June.

G. minutana, Hb.—Local and uncommon amongst poplar. Near Lea Bridge, Wanstead, and Ongar are the only places where I have taken it.

G. trimaculana, Don.—Exceedingly abundant and variable, may be beaten from elm in hundreds; the larva equally common earlier in the season.

G. penkleriana, Fisch.—Common in many places amongst nut bushes and alder, on both of which the larva feeds.

G. obtusana, Haw.—Locally common. I have beaten it from oak, wild rose, and blackthorn. Perhaps most abundant at Fairmead Bottom, Chingford. Larva quite unknown to me.

G. navana, Hb.—Very common amongst holly, in the shoots of which the larva may be found abundantly in June.

Phlacodes tetraquetra, Haw.—Equally common in May and early June amongst birch shrubs.

P. immundana, Fisch.—Not very scarce (and widely distributed) where alder grows commonly, in May; a second and less common brood in August.

P. demarniana, Fisch.—Rather scarce and local amongst birch. I have taken it at Loughton, Warley, and near Ingatestone.

Hypermercia angustana, Hb.—Not uncommon amongst its food-plant, willow, in most places where its food-plant is abundant.

Batodes angustiorana, Haw.—Very common, especially upon yew,

which seems to be the favourite food of the larva, which, however, feeds upon a variety of other trees and plants.

Pædisca bilunana, Haw.—Very common at rest on birch trunks, but not always easily seen on account of its whitish colour matching so closely the bark of the tree.

P. oppressana, Tr.—Very local on *Populus nigra* trunks. I have only met with it, as far as Essex is concerned, near Loughton.

P. corticana, Hb.—Very abundant almost everywhere amongst oaks; varying from greenish to almost coal-black.

P. profundana, Fb.—Much less common; may be occasionally beaten from oak, whitethorn, &c., at Loughton, but I have not taken it elsewhere.

P. ophthalmicana, Hb.—Local, but fairly common where aspen shrubs grow freely. May be beaten from them towards the end of September. Ongar Park Woods, near Ingatestone, and near St. Osyth.

P. occultana, Dougl.—Probably found in most plantations where larch grows freely, but I have only met with it near Brentwood, where the larva is in some seasons not at all rare.

P. solandriana, L.—Distributed throughout wherever birch shrubs are found; some of the numerous vars. are very pretty.

P. semifusca, St.—Usually considered a common insect, but I have only met with a few larvæ on willow near Thames Haven; it must surely be found in many other places in the county.

P. sordidana, Hb.—Common where it occurs, more especially in the larva state, on alders. Warley, Wanstead, Harold Wood, Witham, &c.

Ephippiphora bimaculana, Don.—Local, and never very common amongst birch shrubs. Near Brentwood, Wanstead Park, and rarely at Loughton.

E. pflugiana, Haw.—Generally common, especially in the larva state, in thistle stems. Varies much in size, some of my specimens being no larger than the next species, *circiana*, Zell., which I have not taken in S. Essex.

E. inopiana, Haw.—Very local. I have only found it in two or three places. On the roadside between Stamford Rivers and Epping, and more commonly in a boggy place near East Horndon, always amongst *Inula dysenterica*, in the roots of which the larva passes the winter.

E. brunnichiana, Fröl.—Distributed throughout amongst *Tussilago farfara*, in the roots of which the larva may be found in the autumn and early winter. I have bred specimens of a creamy white colour, with scarcely any markings on the upper wings.

E. fenecana, Haw.—May generally be found in the larva state in the winter in the old gnarled roots of *Artemisia vulgaris*; the imago not so often seen. Laindon, Lea Bridge, Fobbing, and Pitsea.

E. signatana, Dougl.—Mr. Machin used to beat this insect rarely from blackthorn (its food-plant) and oak at Chingford, but I have searched for it there many times in vain.

E. trigeminana, St.—Usually to be found in waste places and on railway banks wherever its food-plant, *Senecio jacobaea*, grows. The larva feeds on the roots, and may be dug up freely in the late autumn. When bred, the female especially is a very pretty insect.

E. tetragonana, St.—Local, and rather scarce. My own series

were obtained by beating the wild rose bushes at Loughton at the beginning of August. Varies much in dimensions. I have a specimen from Hunstanton scarcely larger than the little *C. argyran*.

E. populana, Fb.—Somewhat local amongst its food-plant, willow, and, I think, willow as well. I once bred a number from larvæ feeding on dwarf willow in Wicken Fen.

E. gallicolana, Zell.—May be sometimes beaten from oak, or found at rest on the trunk, but by far the best way to obtain it is to gather the old oak-apples in the winter; the imago comes out, but not always freely, in May. One season I bred over fifty, and another winter's work resulted in a single specimen.

E. obscurana, St.—Has been taken rarely in Epping Forest, but I have never had the good fortune to meet with it in Essex or elsewhere.

Olinidia ulmana, Hb.—A single worn female specimen beaten from a hedge in early June last at Benfleet or Hadleigh is the only one I have met with.

Semasia spiniana, Dup.—Decidedly rare. I have taken it flying in the afternoon late in August at Fairmead Bottom, Chingford, and a few worn ones (generally singly) in three or four distant localities. Although there can be little doubt that whitethorn is the food-plant of the larva, it has never been bred to my knowledge.

S. ianthina, Dup.—Much more common than the last, flying over whitethorn, in the berries of which the little pink larva may be found in September and October, along with the greyish larva of *Laverna atra*. It leaves when full-fed, and spins up in bark; when bred it has a rich purple gloss on the fore wings, which soon fades away.

S. rufillana, Zell.—Common, and generally distributed wherever *Daucus carota*, its food-plant, grows. Larvæ in abundance in the umbels, often eight or ten in a single one.

S. waberiana, Schiff.—Not rare at rest on apple and cherry trunks, in the bark of which it feeds in the larval state. Most of my own series were taken on the trunks of wild cherry growing in Wanstead Park.

Coccyx strobilana, Hb.—Local, and more often found in the larval stage in the cones of spruce fir, pupating therein in April, when by gathering a lot of the fallen cones a series may be bred. I have only met with it near Warley and near Blackmore.

C. splendidulana, Gn.—Fairly common at rest on oak trunks, and may be often bred from oak-apples gathered during the winter.

C. argyran.—Generally common in May and June at rest on oak trunks; not very variable, the only notable specimen is one of a dirty white, without any prominent markings, taken in Bushwood, Wanstead (May 7th, 1892). May often be bred freely from oak-apples gathered in the winter months.

C. nigricana, H. S.—Rare and very local. I took it for the first time in Essex, I believe, on Jubilee-day, 1887, by beating the boughs of a fir tree near Brentwood, taking about twenty on that occasion. I took it again (two only) in 1892; have not worked for it since.

C. lycriniana, D. L.—Very common and variable amongst spruce fir everywhere.

Hemimene jimbriana, Haw.—Not common, but widely distributed amongst oaks in April. I have bred a very few from oak-apple-

gathered in the winter, and netted it very rarely flying in the sunshine over oak bushes.

Retinia buoliana, Schiff.—Very common wherever *Pinus sylvestris* grows, the larvæ often doing considerable damage to the young shoots.

R. pinicolana, Doubl.—Much rarer than the last species; singly in Wanstead Park, Warley, and Blackmore at rest on *P. sylvestris*.

R. pinivorana, Zell.—Pretty common amongst *Pinus* throughout; variable. Some of the vars. are very pretty.

Carpocapsa splendana, Hb.—Much more abundant in the larval than the perfect state; the acorns in September and October are sometimes much infested with them; I bred a large number last year from acorns picked up at Loughton the previous autumn.

C. grossana, Haw.—Locally common in the larval state in beech-nuts, often two seasons before coming out, like the previous species. The imago may sometimes be beaten from beech boughs, or found at rest on the trunks. Epping Forest, Brentwood, &c.

C. pomonella, Lin.—Found, I believe, wherever apple trees grow; also feeds in the apples of the wild crab. The spun-up larva may be found in the winter and spring under loose pieces of bark or moss on the trunks.

C. juliana, Curt.—Somewhat local, but common in certain localities. May be found early in June at rest on oak trunks. I have met with it in several localities, but nowhere so commonly as around Wanstead.

C. nimba, H. S.—This very local and very distinct species seems to be much wanted by collectors. I have bred a good number, perhaps fifty, in the past few years from spun-up larvæ found under rough bark on beech trunks in Epping Forest in the winter. Very occasionally found at rest thereon early in May. I have never met with the feeding larva.

Opadia funebrana, Tr.—Larvæ sometimes found in bought damsons. The late Mr. Machin used to beat the imago rarely from blackthorn at Chingford, and he bred a series from larvæ feeding in the fruit. I have not met with the imago in Essex.

Endopisa nigricana, St.—Very common in pea-fields, or on railway banks amongst vetches; varies a good deal in size and depth of colour. For this reason, I suppose, some authors have made two species from this insect.

Stigmonota leguminana, Zell.—Always very rare and local. Although constantly on the look-out for it every June, I can only boast of three rather indifferent specimens in sixteen seasons! Strictly confined to the Loughton part of Epping Forest, from the village to the borders of Monkwood. Larva unknown to me.

S. perlepidana, Haw.—Not particularly abundant; may be sometimes found flying high up in the sunshine in May. I have bred it from larvæ taken at Loughton feeding on *Lathyrus macrorrhizus*.

S. internana, Gn.—Local amongst furze in open spaces in Epping Forest and near Chelmsford, but nowhere so abundantly as on Warley Common at the end of May and early in June.

S. compositella, Fb.—May be found almost always in clover-fields by sweeping in May and August. Near Childeriditch, Ongar, Canvey Island, &c.

S. weirana, Dougl.—Very common in Epping Forest, at Brentwood,

&c., amongst beech. The larva may be found in September and October between two leaves spun together, pupating therein; very easy to breed.

S. redimitana, Gn.—As common as the previous species, and more generally distributed amongst oaks. The habits of both larva and imago are also precisely the same as *weirana*.

S. regiana, Zell.—Occurs almost everywhere where sycamores grow; the larva spun up under the bark through the winter and spring; the imago not so often met with. The nearly allied and equally beautiful *traumiana*, Schiff., I have never met with.

S. roseticolana, Zell.—Common in the larval state everywhere, in the “hips” of the wild roses. Not difficult to rear if pieces of rough bark are put in the pot for the larvæ to spin up in.

S. germarana, Hb.—May be beaten from or netted flying round oak boughs in May and early June. Epping Forest, Warley, Hadleigh, &c. I have spent many, many hours vainly searching for the larva; one was once bred casually by the Rev. G. Raynor from some oak twigs gathered to feed other larvæ on.

Dichrorampha politana, Hb. — Local, but has been met with very sparingly in several distant localities amongst its food-plant, *Achillea millefolium*. Near Uppminster, Pitsea, Harold Wood, and Purfleet.

D. alpinana, Tr.—I have only met with it in a small clump of *Tanacetum vulgare* growing in a garden at Stratford; the larva in the roots through the winter, and the imago late in July at rest during the daytime amongst the foliage.

D. alpestrana, H. S.—This species, which I had the pleasure of adding to the British list in 1893, seems to be very local; indeed, I have only met with it in the original spot where it first turned up in Epping Forest, and in a similar locality about half a mile away. It has since been taken in Sussex, and doubtless in other places. For remarks concerning habits, food-plant, *vide* E. M. M. vol. xxix. p. 175.

D. petiverella, L.—Very common almost everywhere amongst *Achillea millefolium*.

D. sequana Hb.—Somewhat local, but generally common where found. I have bred it from *A. millefolium*. Loughton, Ingatestone, Childerditch, and many other places.

D. plumbagana, Tr.—Very common and generally distributed; seems very partial to railway banks.

D. acuminatana, Zell.—Local and uncommon. I have only met with it very sparingly amongst *Chrysanthemum leucanthemum* on the railway bank near Harold Wood in September, and the first brood early in June at Mill Green, near Ingatestone.

D. simpliciana, Haw.—Not uncommon amongst *Artemisia vulgaris*, in the roots of which the larva feeds, through the winter. The imago is sluggish, and when beaten out immediately makes for the shelter of its food-plant again.

D. consortana, St.—Local and uncommon. I have very occasionally taken the larva and imago on railway banks. Harold Wood, Woodford, and near Thames Haven. The larval habits are different from the other species of this genus, feeding in the growing shoots of *Chrysanthemum leucanthemum*, and pupating therein.

Lipoptycha plumbana, Scop.—Frequents the same places with *plumbagana*, and the two species are generally to be found together. The allied *L. saturnana* I have never met with.

Pyrodes rheediella, L.—May be taken freely at the end of May flying in the sunshine round the tops of tall hawthorn bushes or hedges. Generally distributed. The larva feeds in the green berries.

Catoptria albersana.—Not common anywhere, but widely distributed. I have taken a fair number at Warley, also, but rarely at Wanstead, Epping, Ingatestone, and Hadleigh. The larva may be found in September in rolled-up leaves of honeysuckle, and is not difficult to breed.

C. ulicetana, Haw.—In swarms round almost every furze bush. I once or twice met with specimens almost as strongly marked as the well-known Scotch form *asseclana*, St., but as a rule they are very plainly marked in Essex.

C. hypericana, Hb.—Somewhat local amongst *Hypericum*, in the young shoots of which the larva may be found early in May. Localities are Ingatestone, Blackmore, South Weald, Chelmsford, &c.

(To be continued.)

NOTES AND OBSERVATIONS.

THE BRITISH MUSEUM COLLECTION OF BRITISH LEPIDOPTERA. — In connection with the rearrangement of this collection some living larvæ have been received from Mr. A. M. Smallpeice, Ringwood, Hants, which have been blown and preserved. We have also received promises of larvæ from Mr. Ed. H. Thornhill, Boxworth, Cambridge; and of a large collection of preserved pupæ from the Rev. J. Green, Rostrevor, Clifton. These will all be extremely useful, and we are much obliged to the donors.—G. F. HAMPSON.

NOTODONTA DRYINOPA, Lower.—I stated (*ante*, p. 42) that the pupa of this moth is furnished with a sharp spike on the head, and that the only explanation accounting for the removal of the round piece of the hard cocoon must be that the pupa cuts it out, for no piercing instrument could be found upon the moth. I have now ascertained that the moth, with this spike, cuts the fragment out! The particulars are these: obtaining some of this season's cocoons, containing pupæ, I cut holes in them, determined to watch for developments, and was soon rewarded by observing that the first moth had burst its pupal shell, and was moving, very deliberately, backwards and forwards, in fact, pushing against the wall in front. Upon removing more of the cocoon, to admit of a better view of the operation, I was pleased and surprised to see that the portion of the pupal shell covering the eyes and that above holding the spike, *remained fixed to the moth's head*; it is kept in position by two little pegs which pass in between the eyes. I have since tried to bottle several of the moths with the head-piece attached, but they strike it off directly they emerge. However, I have sent the pupal head-pieces, cocoons, chrysalids, &c., to a well-known

entomologist, who may have something to say upon this interesting species.—F. P. DODD; Warburton Street, Townsville, Queensland.

HAWK MOTH PUPATING ON BRANCHES OF TREES.—It appears that my note upon *Panacra lignaria* (*ante*, p. 73) is not sufficiently clear, for a leading entomologist in England has taken it to mean that the larvæ had bored into the wood of the trees to pupate! Naturally, he doubted such a strange statement. I trust no others have read the note as he did. Of course the larvæ were spun up in the *leaves* and *twigs*.—F. P. DODD; Warburton Street, Townsville, Queensland.

TORTRICES IN SOUTH ESSEX.—When reading the very interesting article by Mr. Thurnall on "Tortrices in South Essex between 1855 and 1901," I was reminded when I reached the note on *Phoxopteryx myrtillana* that I had recently seen, lying on one of the many new roads in this district, a quantity of bilberry which had been used in the packing of a load of drain-pipes. Such consignments, packed in the same way, are probably commonly seen at Stratford, and might readily account for the importation of *P. myrtillana*, I might add that *Orthotænia ericetana* does occur in South Essex. I have taken it both at Benfleet and Shoeburyness.—F. G. WHITTLE; 3. Marine Avenue, Southend, June 13th, 1902.

FOOD-PLANTS OF THE LARVA OF CNEPHASIA SINUANA, Stph.—In his very interesting "List of Tortrices taken in South Essex, Mr. A. Thurnall says (*ante*, p. 168) that he expects wild hyacinth (*Scilla nutans*) is the only food-plant of the larva of *Cnephasia* ("*Sciaphila*") *sinuana*, and no other food-plant is mentioned in Mr. Meyrick's 'Hand-book of British Lepidoptera,' p. 539 (1895). The idea that the larva confines its attentions to *Scilla nutans* is, however, at variance with the fact, recorded by myself in Ent. Mo. Mag., ser. 2, x. 105 (1899), that Mr. G. Elisha has occasionally bred a few specimens of *C. sinuana* (together with many of *C. pasivana*), from spun-up flowers of *Chrysanthemum leucanthemum*, collected in a wood in North Kent.—EUSTACE R. BANKES; Norden, Corfe Castle, June 7th, 1902.

THE COCCID LECANOPSIS DUGÉSI.—This species was very briefly described by Signoret and Lichtenstein in 1886, and has never since been definitely recognized. In Biol. Cent. Amer., Coccidæ, p. 15, I surmised, that it might be the *Ceioplastodes niveus* (Ckll., 1893). I have now received examples of it from Guanajuato, Mexico, collected there by Dr. Alfred Dugés, who tells me that he did indeed send it to Lichtenstein many years ago, but received no reply concerning it. This, I think, may be considered to settle the matter, and the species will be known as *Ceroplastodes dugési*.—T. D. A. COCKERELL; El. Las Vegas, N.M., May 31st, 1902.

COLOUR CHANGES IN LARVAL HAIRS OF ARCTIA VILLICA.—The influence of certain foods in causing alterations in the coloration of some animals is well known to everyone. As a further instance of this influence in the case of one of the Lepidoptera may be of interest to entomologists, I venture to record the following facts:—I have found that if the larvæ of *Arctia villica*, which usually live on various low-growing herbs, are fed entirely on sallow from the time they are hatched, the hairs covering their bodies are of a black instead of the

usual brown colour. The larvæ are therefore perfectly black with the exception of the red head and legs. The imagines resulting from larvæ modified in this way present no variation from the usual type. I have observed that when the larvæ are partly grown, if the character of their food is changed, and dock and other herbs are substituted for willow, they, after the next change of skin, are clothed with hairs more or less approaching the usual brown colour.—ALBERT MAY; Hayling Island, May 16th, 1902.

NOTE ON *CALOCAMPA EXOLETA*.—On March 12th and 13th I captured at sugar three of these insects (one male and two females). They were placed under a glass cylinder with various food-plants, and a sprig of willow with catkins; the latter were occasionally moistened with syrup on which the moths feasted every evening. Nothing particular was observed until April 13th, when I noticed two batches of ova had been deposited on nettle; these proved to be infertile. On April 15th and 20th pairing took place, and the male was then released. By May 3rd over three thousand ova had been laid, and on May 13th the two females, being still alive, were set at liberty.—EDWARD GOODWIN; Canon Court, Wateringbury, Kent, June 16th, 1902.

PROTRACTED EMERGENCE OF *TEPHROSIA BIUNDULARIA*.—I have been rearing the above from eggs from a female taken at Boscombe last April. The imagoes commenced to emerge on Feb. 8th, and have been coming out regularly up to to-day (June 16th). The imagoes show very little variation.—J. A. FINZI; 53, Hamilton Terrace, N.W.

CAPTURES AND FIELD REPORTS.

COLLECTING NEAR TANGIER IN AUGUST AND SEPTEMBER, 1901. — Autumn is the end of the dry season, and so everything is parched up, including the flowers, and there is not a very large variety of insects on the wing, but we caught *Lycæna telicæus*, *L. betica*, *Chrysophanus phleas*, *Papilio podalirius*, *P. machaon*, during the first few days of August, and *Catocala elocata* came in to light on the 11th; they were beautifully fresh in condition. During the first week we saw *Charaxes jasius*, but did not catch one until the 16th. They were numerous and in splendid condition. They sit head downwards, chiefly on branches of the cypress, and are very fond of basking with their wings open; often they fly right away over a large area, and come back again to the very branch they left. We saw ova of this species on arbutus, and when the larvæ hatched they were green with black horns at each end, the pair by the head having a fork. On the 14th a fine specimen of *Chærocampa celerio* flew into the hall about 6.30 p.m., and on the 20th we caught a worn *Catocala conversa* during bright sunlight. The next day we took a perfect male *H. zelleri*, and a perfect *Deiopeia pulchella*. I obtained *C. celerio* again in the hall on August 25th; the following day freshly emerged specimens of *P. machaon* were out in great numbers, and we caught several beauties. There were also many more *P. podalirius* than earlier in the month. We found several larvæ of the latter feeding on plum and cherry; they

feed up at a great pace. When first hatched the larva is black, and the skin very rough; after the first change it is black, then green with orange spots, and turns yellow before it pupates. We caught twelve *Hesperia nostradamus* in one small patch of rough grass on the 27th. They were mostly very good specimens, and seemed very fond of sitting on the lumps of earth. *C. edusa* was about in fair numbers. By watching the plumbago bushes in the evenings I caught ten *C. celerio*; one evening I caught three specimens, and on another two. They are very regular in their appearance, always coming from 6.15 to 6.45. A friend used to watch them hovering round some begonia plants he had in pots in his verandah, and by this means got some ova, which are green at first and laid singly on the upper or lower side of the leaves. The larva hatches out in about nine days, and is light green with a long pink horn. When about a week old it has two purple eye-like marks on the enlarged segments behind the head. There are brown and green varieties of larvæ, as in *C. elpenor*. On Sept. 3rd we went to a field in an open plain, where my father had seen two or three *Deiopeia pulchella* a day or two before, when he was riding. We caught twenty-five without any trouble, and as many the next day, and were able to bring back some live females which laid a lot of ova. These hatched in about five days, and fed on a plant which abounded in the field where we caught them; it was a low-growing plant with woolly leaves. The larvæ fed-up well, and were brown with reddish spots and some black hairs when I last saw them. The last species I caught before leaving was *Argynnis pandora*, a very worn female, which we induced to lay by giving her some violet-roots in water in a breeding-cage. This is the only one I have seen here, and the date (Sept. 16th) seems very late. The next day a good *Euprepia pudica* was brought to us. Some of the moths I got at light and while butterflying are:—*Grammodes bifasciata* and *G. algira*, *Leucanitis stolidia*, *Catocala electa*, *Hemerophila abruptaria*, *Acontia luctuosa*, *Noctua nigrum*, larvæ of *Acronycta psi*. I noticed a rather interesting example of memory and protective colouring, for in a long hedge of geranium there was one white leaf, and on this a white butterfly or two used to roost regularly for over a week. We did not see much of *Sphinx convolvuli*, but we were early, I think, for its appearance, as we left on Sept. 17th. *Pyrameis cardui*, *Vanessa atalanta*, *Parage egeria*, and the two whites, *Pieris rapæ* and *P. brassicæ*, were not very common, but *Lycana argiolus* was abundant. During the end of August *Macroglossa stellatarum* was common always. There was only rain on two occasions, and then only showers, but from Christmas to Easter it *does* rain.—G. MEADE-WALDO; Eaton College.

PLUSIA MONETA, &C., AT FINCHLEY.—*P. moneta* appears to be fairly well established here, as by searching *Aconitum* I have taken the larvæ in three gardens widely apart. Night-searching for larvæ at Hampstead during the past two weeks has resulted in my taking *Noctua ditrapezium*, which species, however, is not so plentiful as has been the case hitherto. *Noctua triangulum*, *N. festiva*, *N. augur*, *N. baia*, *Triphæna fimbria*, *T. comes*, *Mania typica*, *Leucania lithargyria*, *L. impura*, were all more or less plentiful.—V. E. SHAW; 8, Moss Hall Grove, North Finchley, May 29th, 1902.

COLIAS HYALE IN 1902. — I took a male *C. hyale* here to-day, not far from where I took two specimens on Oct. 20th last year. Are we going to have another clouded-yellow year? — PERCY E. FREKE; Folkestone, May 25th, 1902.

COLIAS EDUSA IN 1902.—To-day one of my boys, who was playing cricket at Felixstowe, saw one of these butterflies in a field where clover and vetches were growing. He gave chase to it and nearly knocked it down with his cap. There were a few gleams of sun during the afternoon, but otherwise it has been a cold unseasonable day and, considering the wet wintry kind of weather we have experienced since the last week of April, it is rather strange that this species should have put in an appearance. It can scarcely have been an immigrant. GERVASE F. MATHEW; Dovercourt, Essex, June 11th, 1902.

EUPITHECIA TRISIGNARIA IN SCOTLAND.—I have been fortunate in rearing several specimens of this insect from larvæ taken on *Angelica sylvestris* last September in Argyleshire. I cannot ascertain whether it has hitherto been noticed in Scotland, and this record of it may therefore be interesting. It certainly does appear in the Clyde District list published last summer. — JOHN A. NIX; 20, Hans Place, S.W.

AMPHIDASYS BETULARIA VAR. *DOUBLEDAYARIA* IN ESSEX.—On May 27th I bred a fine example of the above from a larva taken here last autumn. This is the first time I have observed the variety in this district. To-day I bred another, a very interesting variety, thorax and abdomen black, front part of head white, wings nearly black, dusted here and there with white atoms. — GERVASE F. MATHEW; Dovercourt, Essex, June 11th, 1902.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—May 7th, 1902.—The Rev. Canon Fowler, M.A., D. Sc., F.L.S., President, in the chair. — Mr. Charles R. Chichester, B.A., M.B., L.R.C.P., of Bathurst, Gambia, West Africa, and Clonmore, Co. Cork; and Mr. J. H. Lewis, of Ophir, Otago, New Zealand, were elected Fellows of the Society.—Mr. H. W. Sheppard-Walwyn exhibited a gynandromorphous specimen of *Anthocharis cardamines*, taken near Winchester in 1899. The left side was that of a normal male, the right that of a normal female, with the exception of a splash of orange pigment on the under side of the primary.—Mr. H. Goss exhibited male specimens of *Saturnia carpinii* from Essex, bred on whitethorn, and three males of the same species caught in Surrey by the aid of bred virgin females. He remarked that as a rule bred specimens were smaller than wild, but the bred Essex specimens were much larger than those captured in Surrey. The Essex specimens were light in colour, while the Surrey specimens were not only much smaller in size, but very dark, probably because their larvæ had fed upon *Erica* or *Calluna*.—Colonel C. Swinhoe announced the emergence of *Cossus ligniperda* in the Zoological Society's Gardens from a pupa received in a piece of wood from South

Africa, and said that it was remarkable that the species should have been introduced there, and then brought back to Great Britain.—Professor E. B. Poulton exhibited two *Euplainæ* captured in Fiji by Professor Gustave Gilson, and presented by him to the Hope Department. The species, which belonged to the different genera *Nipara* and *Deragena*, bore the closest superficial resemblance to each other, affording an interesting example of Müllerian or Synaposematic likeness. — Professor Poulton also exhibited several specimens of *Ditina populi* which had been exposed during the pupal stage to the intense heat of July, 1900. In consequence of this “forcing” the moths emerged towards the end of that month, and were markedly different in colour from the normal, being much paler in tint with less distinct markings, and the red of the hind wings of a very different shade. They were also smaller, but this effect may have followed from the larvæ having been brought up under artificial conditions in the Oxford Museum.—The Rev. A. E. Eaton exhibited drawings illustrating the wing of *Pampterinus latipennis*, Etn., MS., a remarkable dipterous fly of the family Psychodidæ, from New Guinea, in the collection of the Hungarian National Museum, Budapest.—Prof. L. Compton Miall, F.R.S., contributed a paper “On a New Cricket of Aquatic Habits, found in Fiji by Professor Gustave Gilson.” Mr. R. McLachlan said this was not the first time an orthopteron of aquatic habits had been noticed. Mr. Pascoe had brought back one such insect from the Amazons, which leaped on the leaves of aquatic plants, and there was a recent record of another species with kindred habits being found in Java. Professor E. B. Poulton remarked that Professor Miall was interested in insects which skate upon the water, but there were also some Orthoptera which were aquatic in another sense. Mr. Annandale had brought back from the Malay region an aquatic insect of this order (a *Blatta*), which was far too heavy to skim upon the surface. The President added that there were some Coleoptera which, although non-aquatic, were so specialized as to be able to use their limbs in a similar manner to water-beetles.—Dr. T. A. Chapman, M.D., F.Z.S., communicated a paper on “Asymmetry in the Males of Hemarine and other Sphinges.”—Mr. E. Meyrick, B.A., F.Z.S., communicated a paper on “Lepidoptera from the Chatham Islands.”—H. ROWLAND-BROWN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. — April 24th, 1902.—Mr. F. Noad Clark, President, in the chair. — Mr. C. R. L. Boxer, of Lee, was elected a member. — Mr. Harrison exhibited a long series of *Taniocampa opima*, bred from ova collected at Wallasey, Cheshire. More than half the specimens were of an extremely dark coloration, and very few of the type form.—Mr. Main, numerous species he had collected in the New Forest at Easter.—Mr. Kaye, a very fine series of *Heliconius lindigii* taken in British Guiana, on the Rio Potaro; and also specimens of the Hymenoptera *Melittia ceto* and *M. caudatum*, both from South America.—Mr. R. Adkin, a series of dark forms of *Psilura monacha*, bred from a New Forest parent taken in 1901.—Mr. Moore, the Orthoptera *Polyspilota striata* and *Tenodera aridifolia* from Africa; *Hierodula vitula* and *Creoboter urbana*, from Sylhet.—Mr. Colthrup, a var. of *Abraxas grossulariata*,

in which the black markings were extended, some coalescing into bands; and a specimen of *Cicada montana* from the New Forest, found close to the pupa-case from which it had just emerged. Rev. F. Perry, a large number of insects from South Africa, including stages of the migratory locust, a wasp which preys upon spiders, Hemiptera showing mimicry, &c.—Mr. Edwards, several species of the Nymphaline genus *Prepona*, and the various species and races of the *Agamemnon* group of *Papilio*.—Mr. Turner, a specimen of the harlequin beetle, *Acrosinus longimanus*, from Trinidad.—Mr. Sich read a paper on "The Lesser British Lepidoptera," and exhibited a large number of species typical of the various groups.

May 8th.—The President in the chair.—Messrs. Harrison and Main exhibited a very varied series of *Taniocampa incerta*, from Delamere Forest, Epping Forest, and Liverpool.—Mr. Moore, *Papilio ptolychus*, male and female, from the Solomon Isles, and *P. erectus* from New Guinea.—Mr. Scourfield gave an address on "Lakes, and their Scientific Investigation," with diagrams.—HY. J. TURNER (*Hon. Rep. Secretary*).

RECENT LITERATURE.

CLAUDE FULLER. "First Report of the Government Entomologist, 1899-1900." Natal Dep. Agric., 1901, pp. iv. and 150; twenty-five plates and numerous text figures.

OUR Colonial Governments have in general far from recognized the pressing need for agriculturists of adequate entomological guidance, and we welcome this first report of the recently established Entomologist in Natal. The work is more in the nature of a general guide to the principal insect pests of the country, with notes for their prevention and destruction, than a special report, and is of a thoroughly practical nature, filling up a distinct gap, as our previous knowledge of African insect-pests was somewhat fragmentary. We hope to see many of these reports from the pen of Mr. Fuller in the future.

G. W. K.

H. OSBORN and E. D. BALL. "A Review of the North American Species of *Athysanus* (Jassidæ)," 1902, Ohio, Nat. ii. pp. 231-57, plates 16 and 17 [also forming Ohio Univ. Bull. (6) 14. 7th Contrib. from Dep. Zool. and Ent.].

RECENTLY (Entom., 1901, p. 336) we had occasion to notice the useful work by the above authors on some obscure American Homoptera of special interest to entomologists in this country, on account of the close relation of the forms treated to their allies of the European fauna.

In the present paper the difficult genus *Athysanus* is dealt with, three new subgenera being separated from Burmeister's original group. Twenty-six species (not including four doubtful) are now accredited to North America, and of these, three are also European, viz. *A. striola* (Fall.), *A. obsoletus*, Kirschbaum, and *A. striatula* (Fall.).

G. W. K.

Butterflies and Moths of Europe. By W. F. KIRBY, F.L.S., F.E.S. With fifty-four coloured plates. 4to. London, Paris, New York, and Melbourne: Cassell & Co. 1902.

It is satisfactory to find that the British interest in European Lepidoptera is large enough to induce Mr. Kirby to produce a revised and greatly extended edition of his popular work on the subject. Apart from the fact that much new matter, and some illustrations, have been added to the text, new coloured plates have been specially prepared for this re-issue. The plates in parts 1, 2, and 4, which we have received, are exceedingly well executed, and far superior in every way to those in the previous edition.

The arrangement and nomenclature of the first edition have not been materially altered, and as a result the work will be found, as regards these matters at least, to differ very little from most of the books on European Lepidoptera published during the past fifty years or so.

Proceedings of the South London Entomological and Natural History Society. 1901. Pp. 76. With two plates. Published at the Society's Rooms, Hibernia Chambers, London Bridge, S.E.

In addition to reports of the five field-meetings held during the year, this volume contains two papers: one on "Fossil Insects," by Mr. W. West, and the other by Mr. A. M. Montgomery, entitled "Notes on Rearing Lepidoptera." We most heartily commend the latter to the notice of all who are interested in the observation of Lepidoptera in their early stages. The author seems exceptionally happy in devising means of obtaining ova from butterflies as well as from moths, and his methods of treating larvæ, from the time of leaving the egg until they attain full growth, are admirable. The paper is illustrated by two plates.

From the Report of the Council we learn that the membership of this firmly established Society is rather larger than in the previous year, the exact number for the year being one hundred and seventy-four. Judging from the nature of the exhibits, as set forth in the "Abstract of Proceedings," the business transacted during the session was thoroughly in touch with the objects of the Society.

Transactions of the City of London Entomological and Natural History Society. Part XI. (1901). Pp. 73. The Society's Rooms, London Institution, Finsbury Circus, E.C.

THE "Reports of Meetings" afford, as usual, interesting and instructive reading. The nomenclature adopted is very decidedly up-to-date, and in most cases the average student will no doubt experience little difficulty in following it; without previous introduction, possibly not a few may fail to recognize such old familiar friends as *Colias edusa* and *Taniosampa stabilis* under the combinations *Eurymus croceus* and *Graphiphora cerasi*.

There are three papers dealing with collecting during holidays at Hunstanton, Folkestone, and New Forest, as well as an important one on the genus *Cideria*. The latter is by Mr. Louis B. Prout, who also contributes a further instalment of the Lepidoptera of the London District.



H. Rowland-Brown. Prof. E. B. Poulton. H. St. J. Donisthorpe. Dr. David Sharp. M. Jacoby. Rev. F. D. Monice. R. McLachlan. H. H. C. J. Druce.
C. A. K. Marshall. A. J. Chitty.

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[No. 471.

VISIT OF THE ENTOMOLOGICAL SOCIETY OF LONDON TO OXFORD.

(PLATE II.)

THE members of the Council and Fellows of the Entomological Society, who had accepted Professor E. B. Poulton's kind invitation to visit Oxford, assembled in the Hope Department of Zoology in the Museum on Saturday, July 5th. After a pleasant afternoon spent in inspecting the collections, now in process of rearrangement, an adjournment was made to Jesus College, where Professor Poulton entertained the following members of the University and Fellows of the Society: the Vice-Chancellor, Mr. D. B. Monro, Provost of Oriel; Mr. A. B. Poynton, Senior Proctor; Mr. A. J. Evans, Keeper of the Ashmolean Museum; Professor Dixey, Dr. David Sharp, Mr. R. McLachlan, Professor Meldola, the Rev. F. D. Morice, Colonel Swinhoe, Mr. A. J. Chitty, Mr. M. Jacoby, Mr. Hamilton Druce, Mr. H. St. J. K. Donisthorpe, Mr. Guy Marshall, and Mr. H. Rowland-Brown. While of the uninvited but appropriate (!) guests who put in an appearance was the rare *Reduvius personatus*, Linn., taken by Professor Poulton on the college wall, crawling up toward the electric light. On Sunday tea was served in one of the meadows that border the Cherwell, after a pleasant pull on the river, now in all its summer freshness, and the haunt of innumerable Odonata, of which *Calopteryx splendens* and *Aeschna cyanea* were perhaps the commonest and most admired. Later in the

day Colonel Swinhoe and Professor Dixey invited a number of Fellows to their high table in Wadham, in the beautiful garden of which college the party ended what must certainly be considered not the least successful of the many hospitalities Professor Poulton and the entomological Fellows of the University of Oxford have so kindly extended to the Council and Fellows of the Entomological Society of London.

H. R-B.

ON CARNIVOROUS LYCÆNID LARVÆ.

BY E. ERNEST GREEN, F.E.S.

(Government Entomologist of Ceylon.)

IN the June number of the 'Entomologist,' Mr. F. P. Dodd describes an interesting larva of an Australian Lycænid (*Liphyra brassolis*, Westw.) from nests of an ant, *Ecophylla smaragdina*. Mr. Dodd gives reasons for believing that the larvæ prey upon the grubs of the ants; but has failed to rear any by providing them with that food.

That the larvæ are really carnivorous seems to be proved by the fact that they seized and attempted to eat some of the grubs; but they do not appear to have been satisfied with that diet. Is it not possible that their proper food may be some Coccid enclosed in the ant's nests? In Ceylon, the arboreal nests of this same ant almost invariably include colonies of Coccidæ, Aphidæ, or Aleurodidæ. We have here also a coccidophagous Lycænid larva (of *Spalgis epius*, Westw.). I have on more than one occasion found them inside nests of another tree ant, *Cremastogaster dohrni*, feeding upon "mealy bugs" (*Dactylopius* sp.) enclosed therein.

The larvæ of another Ceylonese Lycænid (*Aphnæus lohita*, Horsf. = *lazularia*, Moore) frequent the nests of *Cremastogaster* on Acacia and Grevillea trees, upon the foliage of which they feed. These larvæ carry a dorsal honey-gland near the posterior extremity of the body, and are cultivated by the ants on that account. They are herded in special shelters built by the ants, are driven out at night to feed, and brought back to their shelters each morning.

Peradeniya, Ceylon: June 20th, 1902.

DESCRIPTIONS OF SOME NEW SPECIES OF PHYTO-PHAGOUS COLEOPTERA FROM THE ISLAND OF MAURITIUS.

BY MARTIN JACOBY.

In the 'Transactions' of the Entomological Society of London for 1898 I have already described several species from the above locality, which were obtained by Mons. Alluaud, of Paris. I have now received some other species from the same gentleman, which, although closely allied, seem again different, and of which I give the descriptions here.

CÆNOBIUS SULCICOLLIS, sp. n.

Black, the labrum flavous; thorax impunctate, deeply obliquely sulcate at the sides; elytra moderately deeply punctate-striate, black, shining, with a transverse flavous spot at the middle of the disc. Length, $3\frac{1}{2}$ mill.

Head black, nearly impunctate, the clypeus broad, with a few punctures; eyes extremely large, occupying the entire sides of the head and nearly joined at the vertex, deeply notched; antennæ sub-filiform, the lower four joints fulvous, the rest black, basal joint elongate, second one short, third and fourth joints equal, the others slightly thickened and shorter; thorax transverse, narrowed anteriorly, if viewed from above, the sides greatly deflexed, the lateral margins rounded, anterior margin accompanied by a deep groove, the surface entirely impunctate and shining, black, the sides with a deep oblique groove at the middle, extending nearly to the middle of the disc, the basal margin slightly produced at the middle and truncate at that place; scutellum subquadrate; elytra short and parallel, rather deeply punctate-striate, the punctures very fine near the apex, the interstices flat and impunctate, those near the lateral margins convex, shoulders rounded and prominent, the surface black and shining, with a small transverse flavous spot at the middle of the disc; below and the legs black; prosternum broader than long, the base concave.

The structural characters in regard to the antennæ and the thorax scarcely fit in any of the different genera of Cryptoccephalidæ, but the large and nearly joined eyes and the broad prosternum are characters peculiar to *Cænobius*; the deep thoracic groove in connection with the coloration will at once distinguish the species.

RHYPARIDA BIMACULICOLLIS, sp. n.

Obscure testaceous or fulvous; antennæ (the basal joints excepted) black; thorax impunctate, with two black spots; elytra strongly punctate-striate, the interstices minutely wrinkled, the sides broadly and the suture very narrowly black. Length, 5 mill.

Of oblong parallel shape; the head impunctate, opaque, obscure fulvous, with a deep central groove at the vertex; clypeus separated by another very deep transverse groove, its anterior margin concave, the surface finely and sparingly punctured; labrum fulvous; antennæ

slender, the lower three joints fulvous, the rest black, the second and third joints equal, each shorter than the fourth; thorax transverse, the sides rounded, the anterior angles pointed, the basal margin preceded by a narrow but deep partly punctured groove, the surface impunctate, very minutely granulate, with a rather large black spot at each side; scutellum piceous; elytra subcylindrical, strongly punctate-striate, the punctures much finer towards the apex, the interstices here and there finely wrinkled, the suture narrowly and the sides more broadly black, this colour at the latter place abbreviated near the apex; below and the legs fulvous, the posterior femora with a small tooth.

This species—the only one known at present from Mauritius—resembles much in coloration many Australian forms of the genus, but may be separated by the impunctate and maculate thorax, and the markings of the elytra; the latter are somewhat variable, and probably sometimes either entirely absent or more strongly marked. The structural characters are entirely those of the genus *Rhyparida*.

TRICHOSTOLA PUNCTICOLLIS, sp. n.

Black below, above greenish cupreous, clothed with white pubescence; the basal joints of the antennæ and the legs fulvous; thorax very strongly punctured; elytra very closely and equally strongly punctate. Length, 2 mill.

Head metallic greenish, strongly but sparingly punctured, clothed with single long white hairs; labrum fulvous; antennæ extending nearly to the end of the elytra, black, the lower three or four joints fulvous, third and fourth joints rather slender, equal, the following joints slightly thickened; thorax about twice as broad as long, the lateral margins rounded, the surface very closely and deeply punctured, cupreous, sparingly pubescent; elytra with a feeble transverse depression below the base, punctured like the thorax, the punctation arranged in very close rows, the interstices scarcely defined, with a few fine punctures, partly transversely wrinkled and clothed with white hairs; below black, legs fulvous.

I know of no other species of this genus having an equally strongly punctured thorax. *T. rugulosa*, Fairm., is described with a pale fulvous pubescence, and with a finely rugose thorax and elytra; the antennæ are also described as fulvous.

TRICHOSTOLA THORACICA, sp. n.

Below black; antennæ and legs fulvous, above obscure cupreous; thorax transverse, finely rugosely punctured, clothed with grey pubescence; elytra finely punctate-striate, the interstices finely wrinkled and pubescent. Length, 3 mill.

Head finely rugose and pubescent, dark cupreous, opaque; antennæ fulvous, the last joint darker, third joint distinctly shorter than the fourth; thorax more than twice as broad as long, of equal width, the sides scarcely deflexed, the lateral margins rounded, the surface sculptured like the head, and clothed with grey pubescence; elytra with a

slight transverse depression below the base, rather finely punctate-striate, more distinctly so at the sides; the interstices likewise finely punctured, slightly wrinkled and pubescent; legs fulvous.

The general coloration of this species is opaque cupreous, and the thorax is less narrowed anteriorly than is generally the case; the elytral punctured striæ are not so well defined as in most of its allies, owing to the somewhat wrinkled interstices.

TRICHOSTOLA FASCIATIPENNIS, sp. n.

Pale fulvous or ferrugineous, closely pubescent; thorax clothed with yellow pubescence; elytra strongly punctate-striate and pubescent, pale fulvous, the suture and a short discoidal stripe at the disc fuscous. Length, 2 mill.

Head smooth, not perceptibly punctured, the lower portion and the palpi flavous; antennæ fulvous, the terminal five or six joints fuscous, thickened; thorax more than twice as broad as long, the sides feebly rounded, slightly narrowed anteriorly, the basal margin sinuate at each side, surface sculptured and pubescent like the head; scutellum similarly clothed with yellow hairs; elytra with regular and rather closely placed rows of deep punctures, the interstices pubescent, fulvous, the suture narrowly fuscous, the middle of the disc with a short more or less distinct fuscous stripe, not extending to the base or apex; below and the legs coloured like the upper surface.

The general coloration of this species differs from any of its allies, but the elytral stripe is sometimes obsolete or absent.

TRICHOSTOLA FEMORALIS, sp. n.

Below obscure fulvous; the terminal joints of the antennæ and the breast fuscous; above obscure æneous, clothed with fulvous hairs; thorax extremely finely, elytra more distinctly punctured in indistinct rows, the interstices finely and sparingly punctate; legs fulvous, the apex of the femora and tibiæ fuscous. Length, 5 mill.

Of comparatively large size; the head obsoletely punctured and furnished with some fulvous hairs, the anterior margin of the clypeus and the labrum fulvous; antennæ extending to about the middle of the elytra, the lower four or five joints fulvous, the others black, the third and following two joints slender and equal, the rest slightly thickened, shorter; thorax more than twice as broad as long, slightly narrowed anteriorly, the sides rounded, the punctuation very fine and close, the interstices furnished with fulvous pubescence, the posterior margin straight at the sides; scutellum pubescent; elytra with a feeble depression below the base, punctured in rows, rather difficult to distinguish on account of the close and but little less strongly punctured interstices, the latter also clothed with longish fulvous hairs; abdomen and legs fulvous, the femora with a fuscous spot or patch near the apex; the tibiæ more or less similarly coloured at the base.

One of the largest species of the genus, of obscure æneous or cupreous coloration; the punctuation of the thorax and the elytra close and fine; the legs marked with fuscous.

ON SOME NEW GENERA AND SPECIES OF HYMENOPTERA (ICHNEUMONIDÆ, CHRYSIDIDÆ, FOSSORES, AND APIDÆ).

By P. CAMERON.

(Continued from p. 183.)

CHRYSIDIDÆ.

CHRYSIS (TETRACHRYSIS) LEPCHA, sp. nov.

Viridis, supra late cæruleo; antennis tarsisque nigris; alis fusco-violaceis. Long. 14 mm. ♀.

Hab. Khasia (coll. Rothney).

Antennæ black; the basal three joints bluish above; the base of the scape broadly green; the flagellum, except at the base, covered with a pale down. Head green, tinged with blue; the front brassy in the middle; the ocellar region purple; the apex of the clypeus and the mandibles, except at the base, black. The vertex coarsely and deeply punctured, the punctures larger and deeper at the sides near the eyes; the front closely punctured in the middle; the sides much more strongly punctured; the eyes are bordered by a distinctly defined row of punctures; in the centre of the front above is a shallow depression; the orbits behind are bordered by a sharp distinct keel. Thorax above dark green; the base and a transverse band on the pronotum, and the centre of the meso- and metanotum, broadly purple; the pronotum coarsely and closely rugosely punctured, except a smooth impunctate space in the centre at the base, this space being broadest behind; the mesonotum and the scutellum have the punctures larger and deeper, especially in the middle; the middle of the metanotum is punctured like the scutellum, its sides near the wings depressed; the projecting lateral angles are coarsely punctured at the base; the outer sides at the apex have two slight depressions. The upper part of the propleuræ coarsely punctured; the middle is depressed, and bears a few irregular striæ; below this depression is a deeper narrower longitudinal one; mesopleuræ deeply and largely punctured, the punctures running into reticulations. Mesosternum brassy, closely punctured behind; the sides and middle with stronger punctures. The metapleuræ are irregularly longitudinally striated, the striæ being stronger and more widely separated at the base. Legs green, largely mixed with blue; the tarsi black. Wings fuscous, paler towards the apex; the nervures deep black. The basal segment of the abdomen is bluish green; the sides with a distinct brassy tinge; the base and sides are strongly punctured; the centre has the punctures more widely separated and smaller; between the larger punctures are smaller ones. The second segment is closely punctured, the punctuation on the sides being closer and stronger than on the middle, and they have a brassy tint; the third segment is finely and sparsely punctured at the base, the rest of it much more strongly and closely punctured; the apical depression is wide and deep; the foveæ are also deep; the four teeth are large; the outer broader than the inner, and somewhat triangular.

This is considerably larger than any of the other species of this section.

MUTILLIDÆ.

MUTILLA CASIPHIA, sp. nov.

Black ; the basal three segments of the abdomen red ; the scutellum with a narrow deep furrow down the centre ; the area on the median segment reaches to the apex of the truncation, and becomes gradually narrowed ; wings violaceous, paler at the base. ♂. Long. 18 mm.

Hab. Borneo.

Antennæ short, the flagellum opaque ; the third joint slightly longer than the fourth, which is of the length of the fifth. Head narrower than the thorax, densely covered with long griseous hair ; on the cheeks the hair is longer, denser, and bright silvery in tint. Front and vertex coarsely rugosely punctured ; the face and clypeus smooth and shining ; on the centre, above the clypeus, is a conical projection, the narrow part being above ; the clypeus is depressed below it, and foveate on either side of its apex. Mandibles broad ; the apical tooth broad, broadly rounded at the apex, the subapical tooth transverse ; at the base, behind the middle, is a large blunt tooth, which projects downwards ; the base is thickly covered with grey pile, and with silvery hair ; the palpi are black. Pro- and mesothorax closely and strongly punctured ; the mesopleuræ and sternum thickly covered with silvery pubescence ; the mesonotum thickly with longish blackish hair ; the scutellum and post-scutellum with long black hair ; there are two furrows on the apical two-thirds of the mesonotum, a smooth flat keel between them, and a shorter one on either side. Scutellum roundly convex, rugosely punctured ; there is a furrow in the centre of the apical two-thirds, bordered by flat smooth keels, and there is a flat smooth keel at its base. Median segment coarsely and regularly reticulated ; there is a central area which reaches to the top of the truncation ; it is wide at the base, and becomes gradually narrowed to the apex, which is not quite one-half the width of the base. Propleuræ closely rugosely punctured, the apex smooth, with some stout striæ behind. Legs thickly covered with white hair ; the spurs pale. Wings deep fusco-violaceous, paler at the base ; the pale space on the hinder wings more extended than on the front ; the third cubital cellule at the top and bottom is distinctly shorter than the second ; the apex of the radius is obliquely bent upwards, is straight, and at a different angle from the lower part ; the first transverse cubital nervure is rounded, and has an oblique slope ; the second is not oblique, and has a broad rounded curve ; the third is sharply angled in the middle ; both the recurrent nervures are received shortly, but distinctly beyond the middle. The apical half of the first and the whole of the second and third segments are rufous ; the basal five segments are covered with white, the apical more thickly with longer black hair ; the ventral keel is stout, does not extend beyond the middle, and is roundly but not deeply curved below. The pygidium has an elongated bare space, narrowed at the top and bottom in the centre ; the sides on the basal two-thirds are covered with long black hair ; the apex is sparsely but not strongly punctured ; the hypopygium is flat, covered with long black hair, and not keeled.

MUTILLA AESYCA, sp. nov.

Black; the head and thorax red; the front femora and the basal three-fourths of the four posterior rufous; the lower part of the petiole rufous; a quadrate spot on the centre of the petiole, a broad band on the apex of the third segment, widest in the middle, the apex of the penultimate, and the sides of the last segment covered with silvery pubescence. ♀. Long. 11 mm.

Hab. Borneo.

Antennæ entirely black; the third joint more than double the length of the fourth; the fourth and fifth equal in length. Front and vertex rugosely punctured, and sparsely covered with longish black hair; the front indistinctly keeled down the centre. Antennal tubercles dark rufous, smooth. Mandibles black, rufous at the apex; their base punctured; their apical tooth long, rounded at the apex; the hair on their base long and pale fulvous. The head is broader than long, but is largely developed behind the eyes; the occiput is roundly incised, not transverse or convex. Thorax twice longer than broad; the base and apex almost transverse, with their sides rounded; the outer edge of the mesonotum is irregular; the sides of the apex above bear four stout teeth. The top of the median segment has a rounded slope; it is sparsely punctured, and is keeled down the centre. Pleuræ smooth and shining; the upper part projects. Legs black; the front femora entirely, and the four posterior, except at the apex, rufous; they are covered with long white hair; the tibial spines apparently are few in number, and are black; the spurs are pale; the tarsal spines are rufous; their basal joints are thickly covered with pale pubescence. The abdomen deep black; there is a square mark of silvery pubescence on apex of the petiole, in the middle there is a broad band of similar pubescence, broadest in the middle, on the apex of the second segment; a broader one on the penultimate, and the sides of the pygidium are thickly covered with silvery pubescence; the last segment is punctured at the base; the apical half is smooth, shining, and piceous. The keel on the basal ventral segment does not project much, and is rounded at the base and apex; the second segment is smooth and depressed on the basal half, and is there indistinctly keeled in the middle; the epipygium is closely punctured, and is distinctly bordered laterally. On the side of the second segment is an elongated patch of dark rufous pubescence.

(To be continued.)

A LIST OF TORTRICES TAKEN IN SOUTH ESSEX
BETWEEN 1885 AND 1901.

By A. THURNALL.

(Concluded from p. 193.)

Catoptria wimmerana, Wilk.—Strictly confined to the salt marshes along the Thames, and on the coast. Wakering, near Shoeburyness, Thames Haven, Fobbing, and Benfleet. Larva in September and October spun up in the tops of *Artemisia maritima*.

C. cana, Haw.—Very common amongst thistles, in the heads of which the larva may be found in abundance in September. From one of several larvæ taken near Clacton in September, 1888, I bred a female in 1890. This is the only instance known to me of this species taking two seasons to arrive at the perfect state.

C. scopoliانا, Haw.—Fairly common amongst *Centaurea nigra*, in the heads of which the larva feeds. Much more commonly met with some seasons than others. Its near ally, *fulvana*, St., I have only met with in the north of the county, strictly confined to *Centaurea scabiosa*.

C. cæcimaculana, Hb.—Apparently rare and local in the county. I once took a pair amongst *Centaurea nigra*, &c., on a piece of chalky waste ground near Grays, but unfortunately lost the boxes, so that I am still without any Essex examples!

C. æmulana, Schl.—Strictly confined to places where its food-plant, golden-rod, grows. I have found the larva very sparingly between Brentwood and Ingatestone. Very much more abundant on the Kentish side of the Thames, from whence I have bred it freely.

C. tripoliانا, Barr.—I have found this variable species wherever *Aster tripolium* grows in the "saltings." The larva may be found full-fed early in October in the seed-heads. Not difficult to breed if kept fully exposed to all weathers.

C. expallidana, Haw.—Very local; I have only met with it in a rough field not far from Upminster early in July.

C. citrana, Hb.—Mr. Machin used to get this species sparingly on the sloping banks between Southend and Leigh, but I fear it is not likely to be met with there now. Still occurs, I believe, on Canvey Island. Larva feeds in flower heads of *Achillea millefolium*.

Trycheris aurana, Fb.—Local; I have netted a few in rough fields near Hadleigh, but I am told that it occurs in many places.

Lobesia permixtana, Hüb.—Very abundant in Epping Forest, Brentwood district, and many other places, generally amongst oak. I have never met with the larva to my knowledge, but it has been bred from blackthorn and birch. It is almost sure to be found on oak as well some day.

Eupacilia nana, Haw.—Common amongst birch shrubs generally. I once bred two specimens from a dead thistle stem, much to my surprise, until I came to recollect that the stem was picked (in Wanstead Park) from beneath a birch tree.

E. dubitana, Hb.—Rather local. Wanstead, Upminster, Waltham Abbey, Danbury, Wakering, &c. I have bred it from golden rod, *Hieracium tridentatum* and *umbellatum*, and *Senecio jacobæa*. Feeds on the young seeds in September.

E. atricapitana, St.—Local and uncommon in South Essex. I have bred it once or twice from dead stems of *Senecio* from near Thames Haven, and the second brood from the green stems of the same plant from the railway bank near Harold Wood.

E. maculosana, Haw.—Not uncommon in plantations and woods where its food-plant, *Scilla nutans*, grows. The larva feeds on the green seeds in July, and then leaves to spin-up amongst rubbish. Very quick on the wing when flying in the sunshine over a bed of its food-plant. I have met with it in the woods round Warley more abundantly than elsewhere.

E. hybridellana, Hb.—Local and scarce; more abundant in the larva state. I have taken a very few not far from Pitsea, and found the little pinkish larva in abundance, feeding in the seed-heads of *Helminthia echiioides*, but I found it very difficult to breed.

E. angustana, Hb.—The small pale form sometimes swarming in early August over *Calluna vulgaris* at Loughton, Warley, Tiptree, &c. The much more handsome and earlier form (which feeds upon the seed of *Plantago lanceolata*, and, I believe, other plants) is much less common. Thames Haven, railway banks near Romford, also rough fields near Upminster. I was at one time inclined to think we had two species mixed up here.

E. vectisana, Westw.—Very common in the salt marshes amongst *Triglochin maritimum*, its food-plant. Mr. Machin met with a specimen on Hackney Marshes, where it had probably fed on the allied *T. palustre*.

E. affinitana, Dougl.—Common in every salting where *Aster tripolium* grows. I have found the pupa in the spring in the upper part of the previous season's flower-stalks.

E. ulana, Gn.—Seldom seen on the wing, but the larva may be found in most places in the stems of *Alisma plantago*, pupating therein. The insects last over a considerable time; this summer, for instance, I bred one on June 11th, and the next specimen came out on July 12th!

E. notulana, Zell.—I have never bred this insect or met with the imago in Essex; but in 1886 I found, near Brentwood, in the early autumn, several larvæ in stems of *Mentha aquatica*, which were no doubt this species, but I failed to rear any of them.

E. rupicola, Curt.—Scarce and local. I have found the larva on the banks of the Chelmer, near Chelmsford, in the old prostrate stems of *Eupatorium cannabinum*, but this plant is by no means common in the districts where I have collected.

E. roseana, Haw.—May generally, but not always, be found in the larval state in heads of the common teasel. Harold Wood, Benfleet, Pitsea, and Canvey Island. From the last named locality I bred the largest and most beautifully coloured specimens I have seen.

E. ciliella, Hb.—Only met with at Ingatestone, where a few larvæ were found feeding in the seeds of the common cowslip, *Primula veris*.

E. implicitana, H. S.—Not rare; may be found among such plants as *Anthemis cotula*, *Matricaria inodora* and *chamomilla*, in the seed of which the larva feeds, often, but not always, pupating in the stems. I have also bred it freely from flowers or seeds of golden rod from Kent.

E. erigerana, Wlsm.—Very local in South Essex. I have only met with it once on a piece of waste ground near Harold Wood. I found it very abundantly near here (Croydon), and also bred it from flower-heads of *Erigeron acris* a few weeks ago (August, 1901).

Xanthosetia zoegana, L.—Not common, but very widely distributed. I have taken the very striking var. *ferrugana*, Haw., near Stratford, on Leyton Marshes.

X. hamana, L.—Very common and variable amongst the various species of thistle in every locality I have worked. The larva is said to feed on thistles, but I have never met with it.

Chrosis tesserana, Tr.—Common on rough, dry, waste grounds, and in great variety, some of which are very beautiful, others nearly or quite unicolorous. I once bred nearly forty from larvæ obtained the

previous autumn feeding on roots of *Helminthia echioides*, and a few on *Picris*, on the railway bank near Stanford-le-Hope.

Argyrolepis baumanniana, Schiff.—Scarce and local in damp places amongst *Scabiosa succisa*, in the roots of which plant it is believed to feed. Near Brentwood, and beside the road leading from the 'Robin Hood' to High Beech, Loughton.

A. sub-baumanniana, Wilk.—Another scarce and local species. I have only met with it in a rough place on the chalk near Purfleet. I am inclined to think that *Scabiosa columbaria* roots will be found to be the food of the larva.

A. zephyrana, Tr.—Not uncommonly found where *Daucus carota* grows; in the root and lower part of the stem the larva may be found through the winter. Like so many other Tortrices, it is partial to railway banks.

A. maritima, Gn.—Entirely confined to those places on the coast where *Eryngium maritimum* grows. The larva may be found in the winter far down in the sand in the root of this somewhat local plant. I have bred a good number in past years from roots dug up in the neighbourhood of Clacton, but I expect the plant is scarce there now.

A. badiana, Hb.—Generally common amongst burdock, in the seeds (not the stems) of which the larva feeds, together with *Parasia lapella*, leaving when full-fed and pupating amongst rubbish on the ground.

A. enicana, Dbl.—Mr. Machin used to take this amongst thistles, &c., in boggy places in Epping Forest. I have not met with it.

A. ancana, Haw.—This, perhaps the most beautiful of all our Tortrices, although local, is by no means rare in Essex. I have met with it (usually the larva) on the railway banks near Romford, Harold Wood, Stanford-le-Hope to Thames Haven, also at Fobbing, Benfleet, and near Upminster. The larva may be found in the autumn and winter in the roots of *Senecio jacobaeae*, in which it pupates.

Conchylis dipoltella, Hb.—Another beautiful but far more local insect. Mr. Machin used to find the larva in seed-heads of *Achillea millefolium* near Southend; I have not met with it in any stage.

C. francillonana, Fb.—Locally common amongst its food-plant, *Daucus carota*. Harold Wood, Romford, and commonly near Upminster and Benfleet.

C. dilucidana, St.—More commonly found in the larva state in dead stems of *Pastinaca sativa* wherever it grows abundantly.

C. smeathmanniana, Fb.—Somewhat local among *A. millefolium* and *Anthemis cotula* on waste ground. Very common at Temple Mills, near Stratford, Romford, Blackmore, East Horndon, &c. I have found it difficult to breed.

C. stramineana, Haw.—Only met with at Harold Wood and near Pitsea, always amongst *Centaurea nigra*, in the heads of which the larva feeds.

Aphelia osseana, Scop.—Common as this curious species is in many places, I have only met with it on one occasion in South Essex, on a rough, dry slope near Upminster.

Tortricodes hyemana, Hb.—In great abundance in March in oak woods, and varying considerably; some of the specimens are rather pretty, but the majority of them plain. The female is less often met with; I once got a good many by searching the trunks of the oaks after dark.

DESCRIPTIONS OF NEW SPECIES OF HETEROCERA FROM THE TRANSVAAL.

By W. L. DISTANT.

THE following seven species have recently been added to my collection from various sources, and will be eventually figured in 'Insecta Transvaaliensia,' now in course of publication :—

Fam. NOCTUIDÆ.

TIMORA TRANSVAALICA, sp. n.

Head pale brownish, pronotum greyish-pink, abdomen dull ochraceous, sternum greyish-white. Anterior wings very pale carmine or pinky red, with a greyish ray extending from base to about middle of wing, above this a similar but longer ray margining lower area of cell and extending to apical margin, other narrower and more obscure greyish rays between the nervures; posterior wings creamy-white; anterior wings beneath much paler than above. Exp. wings 34 millim.

Hab. Transvaal; Johannesburg (J. Hyde).

AUDEA SUBLIGATA, sp. n.

Head, pronotum, and legs piceous; abdomen, sternum, femora above, and spots to tarsi ochraceous; disk, apex, and lateral margins of abdomen suffused with fuscous. Anterior wings above piceous; posterior wings somewhat obscure greyish, the basal area tinged with pale ochraceous, the veins mostly fuscous, and with a narrow marginal piceous fascia, the fringe greyish. Wings beneath greyish; anterior wings with the costal margin, subapical and apical fasciæ, and outer marginal spots piceous, cellular area fuscous; posterior wings with the posterior apical margin and a costal spot piceous. Exp. wings 38 millim.

Hab. Transvaal; Lydenburg district (Pret. Mus. and Coll. Dist.).

CHALCIOPE PRETORIÆ, sp. n.

Head pale ochraceous, its basal area and antennæ darker; pronotum with the anterior area ochraceous-brown posteriorly defined by a dark transverse castaneous line between the costal angles of the wings, beyond this the colour is pale luteous; abdomen dark ochraceous; sternum and legs pale luteous. Anterior wings pale ochraceous, sparingly speckled with small brown points; two small discal brown spots near base, an oblique costal spot near centre of cell, a reniform discal spot at end of cell preceded by a short costal stripe, followed by a curved series of minute spots crossing wing, the costal largest, all brown, outer marginal area very pale purplish brown, inwardly defined by a white line margined with brown and outwardly by three narrow contiguous whitish lines; posterior wings pale greyish, outer area tinged with pale ochraceous, the discal veins marked with a short fuscous streak. Exp. wings 52 millim.

Hab. Transvaal; Pretoria.

Allied to *C. carnicola*, Hamps.

Fam. NOTODONTIDÆ.

RIGEMA AURIFODINÆ, sp. n.

Head and pronotum golden-yellow; abdomen brownish-ochraceous, the base and apex greyishly pilose, and with a lateral marginal black fascia on each side; sternum and legs ochraceous, with yellow pilosity; tarsi spotted with black; antennæ pale ochraceous. Anterior wings stramineous, with a broad central longitudinal fascia, a shorter and narrower fascia from end of cell, and a very short subapical marginal streak, pale brownish-ochraceous with blackish speckles; posterior wings greyish-white; anterior wings beneath much paler than above. Exp. wings 37-40 millim.

Hab. Transvaal; Johannesburg (J. Hyde). Pretoria (Pret. Mus.).

CERURA SWIERSTRÆ, sp. n.

Head, pronotum, and body beneath hoary-white; a transverse ochraceous fascia preceded by a black suffusion between lateral pronotal angles; a spot at base of head, a transverse basal fascia to pronotum, abdomen above, head beneath, tibial spots, and the tarsi black; base and apex of abdomen above hoary-white; antennæ with the pectination fuscous. Wings hoary-white; anterior wings with costal and outer marginal spots and a speckled suffusion on outer basal area, black; posterior wings with a central subcostal spot and minute outer marginal spots as on anterior wings, black. Exp. wings 32 millim.

Hab. Transvaal; Pretoria (Swierstra—Pret. Mus. and Coll. Dist.).

Fam. COSSIDÆ.

DUOMITUS SQUAMEUS, sp. n.

Body above and beneath, with legs, greyish-brown; pronotum thickly irrorated with pale greyish scales; head and anterior margin of pronotum dark purplish; pectination of the antennæ dull ochraceous. Anterior wings brownish, thickly irrorated with grey scales; a purplish-brown patch occupying costal area for about one-third from base, where it is also about one-third of breadth of wing, a similarly coloured costal spot nearly above apex of cell; posterior wings greyish-brown; wings beneath somewhat uniformly greyish-brown. Exp. wings 58 millim.

Hab. Transvaal; Pretoria.

AZYGOPHLEPS LEOPARDINA, sp. n.

Head and pronotum pale yellowish-white; pronotum with a transverse fascia on anterior collar, two transverse series of four spots in each across disk, and four spots on posterior area—two laterally on each side—black; antennæ greyish-white, speckled with black, their bases broadly black; body and legs pale greyish-brown, tibiæ and tarsi more or less annulated with black. Anterior wings cretaceous-white, somewhat thickly and irregularly black spotted, on apical third the spots transversely crossing wing, before this, or on basal two-thirds,

the spots in more longitudinal series; posterior wings cretaceous, with obscure dark spots placed transversely on their outer areas; the veins of both wings more or less ochraceous; wings beneath as above, but anterior wings with the spots a little paler. Exp. wings 60 millim.

Hab. Transvaal; Pretoria.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE AUCHENORRHYNCHOUS HOMOPTERA.

By DR. H. J. HANSEN.

(Continued from vol. xxxiv. p. 154.)

D. SPIRACLES AND ABDOMEN.*

As regards the number of spiracles, I do not know of any opinions founded upon research other than L. DUFOUR's erroneous statement (in 1833) for the number in *Cicada* (see above),† and WITLACZIL (in 1885) for *Typhlocyba*. In the above cited work, SCHIÖDTE remarks (p. 255): "Rhynchota Heteroptera have without exception ten pairs of spiracles, whose distribution is exactly as I pointed out long ago in the Coleoptera." That is to say, the first pair lie between the pro- and meso-sternum; the second pair between the meso- and meta-sternum; the third pair "on the insect's back concealed by the wings, between the metanotum and the first tergite of the abdomen" (p. 257); the fourth to tenth pairs "lie on the ventral part of the pleural-fold of the abdomen. There are thus seven pairs of ventral abdominal spiracles." *In the types of all four families of the Auchenorrhyncha I have likewise found ten pairs of spiracles.* In the location of the eight pairs of abdominal spiracles, one finds, moreover, features affording exquisite family characters, and some of these deviate from the rule formulated by SCHIÖDTE as being applicable to the Heteroptera. In discussing the abdominal spiracles it will be at the same time necessary to deal with some points in the structure of the abdomen, and each of the families must be treated separately as regards this; while, on the other hand, the thoracic spiracles appear not to offer special differences in the several families, and the latter can therefore be considered together.

a. THORACIC SPIRACLES.

1. *Spiracles between the pro- and meso-thorax* lie in the soft articulating membrane between these two sclerites, almost under

* A somewhat different account has been given of the spiracles by Verhoeff (1894, Verh. Naturh. Vereins Rheinlands, vol. 1. pp. 307-74; abstract in 1893, Entom. Nachr. xix. pp. 369-80), but Handlirsch has recently fully confirmed Hansen's account (1899, Verh. zool. botan. Gesellsch. Wien. xlix. pp. 449-510; see also 'Entomologist,' 1900, p. 20).—G. W. K.

† This refers to the Historical *résumé*, not translated.—G. W. K.

the root of the fore wings, either on the lateral margin of the body (*Cicada*), or a little under the same (*Aphrophora*). They are hidden by the flattened-out, broad, prothoracic lateral margin, and can be seen very easily when this is cut away. They are almost perpendicular (*Cicada*), or inclined postero-ventrally (*Aphrophora*); they are always conspicuous, occasionally very large (*Tettigonia*, *Aphrophora*).

2. *Spiracles between meso- and meta-thorax* lie concealed under the articulation of the hind wings, a little from the lateral margins on the ventral surface. They are smaller than (*Aphrophora*), of equal size with (*Cicada*), or almost larger than (*Fulgora*), the first pair. In, for example, *Fulgora* they are externally visible without preparation; in the *Stridulantia* they are best viewed in profile, as they are more or less covered by a posteriorly-directed flap arising from the posterior margin of the mesothorax; in the Jassidæ and Cercopidæ they are covered by a similar plate-shaped projection, and lie so completely hidden that they are not easy to discover.

b. ABDOMEN AND ITS SPIRACLES.

1. *Stridulantia*.—The tergite of the first segment of the abdomen is well developed, especially about the middle, but much shorter than the following segments; the sternite is also well chitinized, especially in the male more strongly and peculiarly. The second segment is solid throughout, without any trace of membrane between the tergite and the sternite; dorsally it is quite as long as the following segments. Each of the third to seventh segments is formed out of a sternite, which is far from reaching the lateral margin of the body, and of a tergite, which is extended to that lateral margin; between the lateral margins of the tergite and the sternite there is found a somewhat broad band, which, according to the explanation here adopted, is taken to be the *Pleuron*. This consists of two parts, *viz.*—externally, a conspicuous “chitinous” plate, which (except in *Cystosoma*, and partly in individuals of other forms with somewhat swollen abdomen) is separated from the tergite by a very narrow, thin, or somewhat thin marginal membrane; and, interiorly, by a (except in *Cystosoma*) distinct, narrow, thin membrane between the plate and the sternite.* The tergite of the eighth abdominal segment is coalesced with the pleural chitinous plate, whilst the sternite is entirely modified as a genital segment. (The following segments are not considered either in this or in the following families; it will only be stated that one finds in both sexes of

* The location of the spiracles in the third segment in, for example, *Tettigonia viridis* suggests the reckoning of the plate as part of the *Pleuron*, not as a ventral part of the tergite; the structure in *Cercopidæ* and *Jassidæ* suggests the consideration of the skin between the plate and the tergite, not as a suture, but as a part of the *Pleuron*.

Cicada, posterior to the eight spiracle-bearing abdominal segments, three distinct segments in addition to the "anal flap" (= telson), and that the ninth and tenth abdominal segments are, in the male, extremely modified; whilst in the female only the ninth is very strongly modified, the tenth being small and only slightly altered.)

The first pair of abdominal spiracles lies on the ventral side of the body close to the lateral margins in a depression at the base of the abdomen, surrounded by solid chitin (a part of the metasternum), which, particularly in the male, is very thick, and of a considerable breadth; they are transverse like the thoracic spiracles, but somewhat shorter than these. In most females they are generally not difficult to see when the abdomen is bent a little upwards, but in some females, and in most males, they are covered by the so-called "Opercula." The seven remaining pairs of spiracles are considerably smaller than the first pair, and of different structure; they are entirely open, with an oval or almost circular orifice, the Peritreme being a solid ring, which is also furnished with a great number of hairs directed towards the centre of the spiracle. The locking-mechanism lies a little behind the Peritreme. The first of them (thus the second pair of abdominal spiracles) is not altogether easy to discover. They lie like the first pair on the under side of the abdomen a little from the lateral margin close to the front margin of the second abdominal segment, but the chitin of this segment is inclined inwards (downwards seen from below) in such a manner that a transverse furrow arises, so that the spiracles actually lie near the bottom of the outer angle of this furrow, looking forwards and towards the insect's middle plane. In the female one can see them without preparation, but in the male they are often concealed by the "Opercula." Each of the third to eighth abdominal spiracles lies in the sternite itself a little behind its front margin, and close to the Pleuron.

2. *Cercopidæ*.—The first tergite extends right to the lateral margins, where it is moderately long,* but not strongly chitinized; towards the median line it shortens strongly, or even disappears as a solid formation; the sternite is short, well chitinized at the middle, and terminates far from the lateral margins. The second tergite is somewhat long, well chitinized, and extends right out to the side margins; the sternite is shorter medianly than the tergite, and is still shorter towards the lateral margins; it extends right out to this, and almost to the apical margin of the tergite

* In the original the word is "broad," but Dr. Hansen now accords with me that the words "broad," "narrow," "long," "short" should refer solely to the situation of the margin in question with regard to the longitudinal axis of the insect. This paper therefore is not a literal translation of the original in these respects, but represents Dr. Hansen's present views.—G. W. K.

(the sternites of these two segments are not visible without preparation, and the posterior coxæ should preferably be cut away, as they project forwards over them, and partly cover them). The third to eighth segments are formed essentially like those in the *Stridulantia*. Only the inner part of the Pleuron is always very distinctly developed, but not, however, particularly broad; it is now and then almost entirely membranous, but occasionally contains chitinous portions. In *Aphrophora alni* there are thus found in the membranous part of the Pleuron of the third to fifth segments two distinct narrow chitinous plates (an anterior and a posterior) in each segment.

The first pair of spiracles lies inside the lateral margins on the lower side of the body as far forward as possible towards the posterior margin of the metasternum, and on account of the shape of this plate, the projection of the coxa and the aperture of the spiracle being rather feebly defined, the spiracle is difficult to perceive. The second pair of spiracles lies on the lateral margins in a small chitinous piece, which projects a little forward and downward from the lateral angles of the second sternite of the abdomen, and, indeed, may appear to correspond with the large outer pleural chitin-plate in the following segments. The third to eighth pairs lie on the under side in the inner part of the Pleuron, and if this contains chitinized fragments it is located in the first of these. At least the second to eighth pairs of spiracles are cleft-shaped, fairly large.

3. *Jassidæ*.—The structures of this family agree largely with the foregoing. The form, the structure of which I have found easiest to study—and, if one likes, most typically developed—is the female of the very common *Tettigonia viridis*, L., for which reason it is the basis for the following observations.

The tergite of the first segment is not developed medianly, but more towards the side it appears as a not particularly long plate, which then contracts again, and terminates a little from the lateral margin; the sternite is very short, and does not extend quite out to the lateral margins, and is interrupted medianly. The second tergite is well developed, not particularly long, and extends almost to the side margins; the sternite is medianly nearly as long as the tergite, and its shortened lateral margins reach almost to the lateral margins of the body. The third to eighth segments are very similar to those in the *Cercopids*. On the fourth to seventh segments each Pleuron consists of a broad, strongly chitinized, exterior piece, and an inner band, which for its entire length contains a narrow chitinous plate; in the third and the eighth segments an inner plate of that kind is not developed.

(To be continued.)

NOTES AND OBSERVATIONS.

WHITE ANTS OR TERMITES.—Among the wonders of natural history, few can surpass the dependence of the life of these insects on that of their queen. This, at least, is generally believed in Bloemfontein, and I have reason to believe it true from what I have known myself. Many years ago (1879) a colony established itself close to the cathedral and to the house of Bishop Webb. Two Dutch Boers undertook the rid-dance, and had to go eleven feet deep before the queen was found—a large grub, with head like that of a bee. Till then the soldiers fought hard, and the hands of the Boers were covered with blood. After she was captured and taken away they became lethargic, and I had some difficulty in inducing one to attack me—but the mandibles cut like a pair of sharp scissors. I left South Africa shortly afterwards, but was glad to ascertain that no mischief whatever occurred afterwards. The creatures are called “houtkoppers” (wood-cutters), and I have seen a plant about the size of a slate-pencil cut to pieces by them. The white ants of Queensland, though about as mischievous, are, as far as I have seen them, much smaller and different. I was told by the Government ant-destroyer that he had found fifty-three queens in one nest! He had, of course, some difficulty in convincing other experts. In that colony another sort of ant, of a dull red, of exactly the same size, and so able to go up their tunnels, fights and destroys many.—(Rev.) GEORGE GLOVER; 55, Church Road, St. Leonard's-on-Sea.

TWO VARIETIES OF *LYCÆNA ICARUS*.—I have been fortunate enough to take two varieties of *Lycæna icarus* this year in Dorking, both of them on the same ground on the south side of Ranmore. On June 7th, while pill-boxing *Lycæna bellargus* among the wet grass in the evening, I came upon a male specimen of *L. icarus* quite normal on the upper side, but whose under side was as follows:—The marginal spots are very faint on both the fore and hind wings, and on each wing, in place of the usual thirteen or nine black spots with white circumscription, there is a single spot, the middle one only, all the rest of the wings being plain ashy-grey. It is rather a small specimen, but, luckily, in perfect condition. On June 14th, when engaged upon a similar pursuit, I took a gynandrous specimen. It possesses the male coloration on the left side, and the female on the right, the latter being of the blue form, though the black discoidal spot and the marginal spots are quite distinct. This, too, is in perfect condition.—F. A. OLDAKER; Parsonage House, Dorking, July 11th, 1902.

VARIETIES OF *AMPHIDASYNUS BETULARIA*.—I was much interested in Mr. Gervase Mathew's note (*ante*, p. 197) on the variety of *A. betularia* bred by him. Last year I took here a typical male, *in cop.* with a black female, resembling the variety described by Mr. Mathew. The latter I kept for ova, and she deposited a large number, the larvæ from which fed up well on plum. I unfortunately kept the pupæ too dry, and only thirteen moths were bred, but every one of them had black primaries dusted with white scales, some rather more than others; thorax and abdomen black, some examples having a few white scales on these also, front part of head white; secondaries pale. I may mention that I was walking in the road when I saw the male

parent, which was very conspicuous on a dark brick wall, but I had no idea the female was there also, until I came right up to it. This struck me as being an excellent instance of the usefulness of melanism for protective purposes in the neighbourhood of smoky London.—F. M. B. CARR; 46, Handen Road, Lee, S.E.

BRITISH TACHINIDÆ.—I should be very greatly obliged to any rearers of Lepidoptera, &c., who would save for me any Tachinidæ (parasitic two-winged flies) they happen to breed.—COLBRAN J. WAINWRIGHT; 2, Handsworth Wood Road, Handsworth, Staffs.

BRITISH ORTHOPTERA.—Mr. W. J. Lucas, of 28, Knight's Park, Kingston-on-Thames, who is preparing a Monograph on British Orthoptera, would be glad to receive local lists of the various species of earwigs, cockroaches, grasshoppers, locusts, and crickets. The lists should include every species, however common, and those from Scotland and Ireland would be especially welcome.

CAPTURES AND FIELD REPORTS.

ACIDALIA MARGINEPUNCTATA AB.—I see in the June number of 'The Entomologist' a figure of a curious aberration of *Acidalia marginepunctata* taken by Mr. J. P. Lawson at Clevedon. I took an exactly similar specimen in Sheppey, on the evening of Aug. 26th, 1899, with a large number of typical examples.—E. A. COCKAYNE; 6, Tapton House Road, Sheffield, June 23rd, 1902.

PYRAMEIS (VANESSA) CARDUI IN FIFESHIRE.—As the appearance of this butterfly in Scotland is irregular, it may be worthy of note that I took a fine specimen on Kemback Hill, four miles from here, on June 28th last. It was flying among firs, over heather adjoining cultivated land.—HENRY H. BROWN; Cupar-Fife.

SPHINX PINASTRI AT WINCHESTER.—On June 30th one of my pupils took a fine specimen of *S. pinastri* on a lamp-post in the suburbs of Winchester.—E. I. JOHNS; Winton House, Winchester.

IPHICLIDES (PAPILIO) PODALIRIUS IN LANCASHIRE.—A short time ago a scholar attending a country school in South Lancashire brought a live butterfly to the school and gave it to the master. The latter killed it, and asked a friend interested in the Lepidoptera to mount and name it. He said it was *Iphiclides podalirius*. The specimen was then shown to several collectors, some of whom strongly urged that inquiries should be made concerning its capture, &c., and the results published, as the affair was one which could not fail to be interesting to all engaged in the study of the Lepidoptera. The inquiries resulted as follows:—The fly was found entangled in a spider's web, in the forcing-house of Mr. Wm. Westwell, florist, Pennington Leigh. The following is a list of all the plants which have been in that house during the last year:—Small palms from Belgium, ditto from St. Albans, roses from France, spiræa from Holland, azaleas from Belgium, aralia (seeds) from France.—WM. BURTON; 39, Newton Road, Lowton, Newton-le-Willows, July 1st, 1902.

LARVÆ AND PUPÆ OF *PLUSIA MONETA* IN LONDON.—Between June 4th and 10th last I found fifteen larvæ and three pupæ of *Plusia moneta* on Delphinium in a garden at Herne Hill, Surrey, which place is within the four-mile radius of Charing Cross. All the larvæ have now spun up, except three which died; those which spun up on the under side of the leaves made cocoons of a semi-transparent white colour, which after about a week changed to a rich golden yellow, while those (the majority) which spun up on the wood of the breeding-house spun similar cocoons, but these, however, have not changed colour. Two imagos, up to the present time, have emerged.—RALEIGH S. SMALLMAN; Carlton House, Herne Hill, S.E., July 5th, 1902.

CYMATOPHORA OCTOGESIMA (OCULARIS) AND *PLUSIA MONETA* IN MIDDLESEX.—It may interest you to hear that I have taken, at Hampton Hill, two good specimens of *C. ocularis* at light this month, one on the 6th and the other on the 7th; also two specimens of *P. moneta* over flowers at dusk, one on the 12th and the other on the 13th of this month.—HERBERT S. JOB; The Vicarage, Hampton Hill, Middlesex, July 20th.

HYDRELIA UNCULA IN SURREY.—On the occasion of the Field Meeting of the South London Entomological and Natural History Society, held at Wisley on July 5th last, several specimens of *H. uncula* were captured. On the 14th of that month the species was still out, and I secured five specimens in fine condition. This species does not appear to have been previously observed in the county.—RICHARD SOUTH.

DITULA SEMIFASCIANA AND ANTITHESIA SALICELLA IN SURREY.—At Wisley, on July 14th, whilst collecting *Eupithecia tenuiata* from the lichen-covered stems of some large willows, I obtained one example of *D. semifasciana* and one of *A. salicella*; another specimen of the last-named species was missed. With regard to *D. semifasciana*, I may mention that I am indebted to Mr. A. Cant for a fine specimen that he reared from a larva found at Wimbledon in the spring.—RICHARD SOUTH.

HEDYA LARICIANA IN SURREY.—This species is sometimes fairly common among the larches on the Deepdene estate at Boxhill. I looked for it there on July 12th this year, but did not see it. At Wisley, however, on July 14th, I netted two specimens, and others were seen, but as I had the misfortune to break the top joint of my net-rod, I was unable to capture any more examples.—RICHARD SOUTH.

TORTRIX PICEANA AND SERICORIS BIFASCIANA IN THE ESHER DISTRICT.—As very close searching during the latter part of May and the beginning of June had failed to detect the larva of *T. piceana*, I had formed the opinion that the species would be scarce in the perfect state this year. On the contrary, however, it proved to be more abundant than I have ever known it to be before. A female specimen was beaten out during the afternoon of June 28th, and between six and seven o'clock in the evening of the same day several examples were seen flying high around pines, and two males and one female were captured. Between 3 and 4 p.m. on July 1st Tortrices were flying in great numbers over and around the pine trees; most of these were out of reach, but by four o'clock, when a heavy thunder-shower caused me to retreat, I had

secured six male specimens of *T. piceana*. Two males and one female were netted on July 3rd, and twelve specimens, including one female, were captured on July 7th. On the last-named date most of the examples taken were disturbed from heather under the pines in the afternoon, but scores were seen madly careering around the trees about 7 p.m. *S. bifasciana* was common on each of the dates mentioned, but the majority of the specimens netted were not in good condition after the thunderstorm.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*June 4th, 1902.*—The Rev. Canon Fowler, M.A., D.Sc., F.L.S., President, in the chair.—Mr. Stanley W. Kemp, of 80, Oxford Gardens, Notting Hill, W., was elected a Fellow of the Society.—Mr. H. W. Shephard-Walwyn exhibited a recently-emerged male specimen of *Lampides baticus* taken at Winchester in September, 1899, and two varieties of *Lycæna icarus*.—Mr. C. P. Pickett exhibited one asymmetrical male and two females of *Dilina tilie*, and a series of the same insect showing great variation of colour and marking, bred during May, 1902.—Mr. F. Merrifield showed enlarged photographs of larvæ of *Hygrochroa syringaria*. The larva is usually represented in an attitude in which it is practically never seen, crawling in an elongated form with its pair of long fleshy dorsal tubercles conspicuously projecting. But its habit is not to crawl, except in the dark, when it cannot be seen. All day it clings to the edge of a leaf or to a twig, in an attitude about as unlike a caterpillar good for a bird to eat as anything can well be, presenting a quadrangular form, something like a square hassock with tassels at the corners, and in one or two other places; the body is bent so as to form four right angles, the head and the anal segments forming two of the tassels, and the rest of the body forming a square from which the pair of long tubercles project at one corner, the other dorsal tubercles making other projections. Usually the parts of the body are so closely appressed that no daylight is visible between them, even when seen broadside against the light, which can rarely happen in nature. The resting attitude, unlike that of the *Selenias*, is practically the same in all stages of growth, and at all ages it is especially addicted to hanging down a few inches suspended by a silken thread, still preserving the hunched-up quadrangular form. Compared with the very dissimilar but equally misleading attitudes of other larvæ—such as the rigid *A. betularia* or the thorn-like *Selenia*—it seems an interesting illustration of the very different forms of disguise by which the result of escape from danger is attained. Mr. Merrifield also showed photographs of the dark-brown bronzy pupa of this species, in its hammock of open network of silk, very slight but exceedingly strong, from the bottom of which the larval skin is projected, not shortened and compressed, but pushed through the network, and hanging down like a long tail, so as apparently to attain the same end as in the larval stages, the disguising of its real nature; it looks very unlike an ordinary pupa.—Professor E. B. Poulton, F.R.S., exhibited a lantern-slide showing the perfect protec-

tive resemblance of *H. leucophæaria* to the oak-trunk upon which it rested.—Mr. A. Bacot exhibited hybrid larvæ resulting from a pairing between a male *Malucosoma neustria* and a female *M. castrensis*, also larvæ of *M. neustria*, and reputed larvæ of *M. franconica*, for comparison. He said that this year's brood of hybrid larvæ had separated into two batches, the "Forwards" being now nearly full-fed, and from one and a-half to two and a-half inches in length. The "Laggards" were not yet half grown, being half to three-quarters of an inch long, in this respect exactly following last year's brood resulting from a similar cross, in which case the "Forwards" produced only female specimens, while the "Laggards" produced only males.—Mr. H. J. Elwes, F.R.S., read a paper on "The Butterflies of Chile," and exhibited a selection of the specimens he had taken during December, January, and February, in that country. The endemic species of Satyridæ and Hesperidæ constituted about two-thirds of the whole butterfly fauna, Nymphalidæ and Lycænidæ being very few in numbers. Some butterflies of Holarctic types, such as *Colias rautieri*, had an extremely wide range, and extended, with little variation, right down to the Straits of Magellan. Among the most remarkable species which he showed was the unique Satyrid, *Argyrophorus argenteus*, the upper side of which is of a brilliant metallic silver colour, nothing similar existing in the whole family. This flies on open grassy hill-sides; whilst in the forests close by, a Hesperid, *Cyclopiques puelmae*, has its wings on the under side entirely of a metallic golden colour, this also being unique among the Hesperidæ. It seemed impossible to account for such remarkable cases of coloration by any theory of protective colouring. No natural frontier appeared to exist between Chile and Argentina, and nearly all the mountain species occurred on both sides of the political frontier, there being little difference between the alpine and the low country species.—Mr. S. L. Hinde read a paper, illustrated by lantern-slides, upon "The Protective Resemblance to Flowers borne by an African Homopterous Insect, *Flata nigrocincta*, Walker." He said that "the cluster of insects grouped to resemble a flower-spike," which forms the frontispiece of Professor J. W. Gregory's 'Great Rift Valley,' had attracted some criticism, and that as he was familiar with the insect figured, and with its larva, in a wild state, it seemed desirable to publish the evidence. In the plate the insects are collected on the vertical stem, the green individuals uppermost considerably smaller than the red beneath, like the unopened green buds towards the top of a flowering spike as compared with the expanded blossoms below. The separate representations of the green and red forms, however, indicate no difference in size, and experience confirms this conclusion, so that the impression conveyed by the frontispiece plate is erroneous. After further noting that the uniform deep pink colour of the exposed parts of the insects figured was also incorrect, Mr. Hinde remarked that he had never seen the insects grouped according to their colours, but invariably mixed; that he had never found larvæ and imagines on the same stem, or even together on the same tree or bush; nor did the imagines affect vertical stems, but always those actually or approximately horizontal. When disturbed the imagines fly, and the larva hops, a short distance in any direction, but soon collect into groups again. The larvæ toward the end of a

growing branch are the smallest, and this arrangement might possibly reconcile Professor Gregory's account with the more recent observations.—H. ROWLAND-BROWN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. — May 22nd, 1902.—Mr. F. Noad Clark, President, in the chair. — Mr. Edwards exhibited fine specimens of *Morpho cypris* from South America, and several species of the genus *Caligo*.—Mr. F. M. B. Carr, a variable series of *Boarmia cinctaria* from the New Forest.—Mr. Barnett, *Hybernia marginaria* from West Wickham woods, one example approaching the form var. *fuscata*.—Mr. South, male and female *Liphyra brassolis*, with ova, preserved larva, larva-skins, a pupa, and a pupa-case, illustrating the curious life-history of this Queensland Lycænid, received from Mr. Dodd, and read notes.—Mr. B. W. Adkin, series of *Tæniocampa miniosa*, pale forms, and series of *T. incerta*, both from the New Forest. — Mr. Montgomery, bred *Pieris napi*, showing slight gynandromorphism in the markings. — Mr. Main, living larvæ of *Lithosia mesomella*. It was remarked that this larva has spatulate hairs.—Mr. Lucas read the report of the field-meeting held at Bookham on May 10th.

June 12th.—The President in the chair.—Mr. Ashdown exhibited living larvæ of *Attagenus pellis* feeding on wool.—Mr. Tonge, a *Noctua* he had recently captured, and which was afterwards recognized by Mr. South as a worn and probably hibernated example of *Hadena protea*. —Mr. Moore, a specimen of the rare *Pseudacraea trimenii* from the Transvaal Colony, which differed from the type in the large area of white on the lower wings.—Mr. Lucas, *Gryllotalpa vulgaris* (the mole-cricket) from Brockenhurst, and an example of the dipteran, *Meriania argentifera*, from the New Forest, and new to Britain.—Mr. R. Adkin gave a report of the Annual Congress of the South-Eastern Union of Scientific Societies, held at Canterbury on June 5th and 7th.—Mr. Hy. J. Turner read the report of the field-meeting held at Reigate on May 24th.—HY. J. TURNER (*Hon. Rep. Secretary*).

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—June 16th, 1902.—Mr. R. C. Bradley in the chair.—Mr. Bradley showed *Syrphus barbifrons*, Fall., taken at Sutton on April 14th last. He went specially to find it, but it was scarce, and very difficult to distinguish from *Melangyna quadrimaculata*, Ver., amongst which it was flying. The latter species is common, the former species very rare and local, and possibly overlooked amongst the *quadrimaculata*. He obtained six males and five females; also, at the same time and place, he took one *S. arcticus*, Zett. (male). All were taken flying at swallow-bloom. — Mr. C. J. Wainwright, a boxful of Trypetidæ, including a large number taken in Wyre Forest on July 13th, 14th and 22nd last. On these three days he obtained no less than thirteen species of this one family. *Trypeta onotrophes*, Lw., in great abundance; *T. florecentiæ*, L., and *T. serratulæ*, L., not common, but a fair series of each from various thistles; *Urophora stylata*, F.; *Carphotricha guttularis*, Mg., and *C. pupillata*, Fall., in single ones; *Tephrites miliaria*, Schrk., common; *T. proboscidea*, Lw., a short series; *T. ruralis*, Lw. (two); *T. tessellata*, Lw., common; and a few of the commoner and more usual species. —COLBRAN J. WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

G. BREDDIN. "Die Hemipteren von Celebes." 1901. Abh. Naturf. Gesellsch. Halle, xxiv. pp. 1-217, 1 plate and 1 text-map [separately paged copy].

As everyone knows, Celebes is remarkable, as regards its Vertebrata at least, in belonging strictly neither to the Oriental nor to the Australian Region. Dr. Breddin has been so fortunate as to have had for examination the collections recently made by Fruhstorfer, Kükenthal, and the brothers Sarasin, and the result is an elaborate and carefully-prepared contribution to our knowledge of insular faunas, consisting of (1) a list, with localities, of all the certain and dubious Celebesian Rhynchota; (2) description of new forms, &c.; and (3) the inter-relations of the various Malayan faunas, the latter section being very fully discussed. Of course, as is natural where non-specialists have been the collectors, it is of the Cimicidæ, Lygæidæ (= Coreidæ), Reduviidæ, Cicadidæ, and Cercopidæ that we have the fullest information, 75 per cent. of the recorded forms being referable to these families.

The claims of 221 species are regarded as established, of which 143 are precinctive* so far as is known. Of the rest, a small number are widely distributed throughout the Oriental and Australian Regions; most, however, are confined to one or more of the neighbouring islands, principally Java, Sumatra, Borneo, and the Philippines. The conclusions reached are as follows:—

(1.) A land-bridge existed formerly, connecting East Java and South Celebes.

(2.) A similar bridge between the Philippines (Mindanao) and North Celebes.

(3.) Of these two, the former has been a little the more productive.

(4.) Borneo has not a single rhynchoton in common with Celebes (this is also the case with the mammals, land-birds, reptiles, amphibia, and land- and freshwater molluscs), which is not also found at the same time in Java, or in the Philippines, or in both of these latter. Celebes and Borneo have therefore never been in direct communication so as to render possible an interchange of species, the Macassar Straits forming an impassable boundary. The species common to Borneo and Celebes have become interchanged, either partly by a detour through Java, or partly through the Philippines, or probably by both ways at the same time.

(5.) Java has not been directly connected with Borneo, Sumatra having been the connecting link.

(6.) A bridge between Borneo and the Philippines existed formerly *via* Bangvey Island which, though nearer Borneo, shows some clear Philippine types.

I have noted only a single omission from the list of authentic Celebesian Rhynchota, *viz.* the widely distributed *Clerada apicicornis*, Signoret.

G. W. KIRKALDY.

* "Confined to the area under discussion." See D. Sharp, 1900, 'Fauna Hawaiiensis,' ii. p. 91.

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ON THE LARVA OF *LIPHYRA BRASSOLIS*, WESTW.

By DR. T. A. CHAPMAN, F.E.S.

Two of the larvæ of *Liphyra brassolis*, sent to the Editor by Mr. Dodd (*ante*, p. 154), are apparently a full-grown one and another of very much smaller size. These two are so very different that, if they came from different places with different histories, one would never suspect their being at all related.

The smaller one is 6 mm. long and 2.3 mm. wide, very flat, reminding one very much of the larva of *Camponiscus luridiventris* (a common alder sawfly) in its general size and form, or, for that matter, of an ordinary *Lycæna* larva, if we make it first colourless, then nearly flat instead of raised along the dorsal line, and, thirdly, if we somewhat exaggerate the rounded lateral projections of the segmental margins. The segmental divisions as seen dorsally are twelve, of which the first and last, of course, are terminal. White and soft as this larva looks, the margins nevertheless have something of the appearance and structure of the full-grown larva, having a strong chitinous binding, divided into small cells. The prothorax has a slight angle on either side, allowing the front between the two angles to be a transverse straight line; beneath it is the head, placed quite centrally beneath it, but quite free from it and capable of much movement, including probably protrusion in front. The last segment, which is seen dorsally, is the ninth abdominal, and beneath this is the tenth, carrying the anal prolegs; the true segmental divisions are very plain on a ventral view of the larva. The prothoracic spiracle lies in the fold between the pro- and mesothorax, but the abdominal spiracles are each on about the middle of its own segment, placed dorsally, about half-way from the middle line to the margin. I do not detect anywhere any hairs or tubercles.

The nervous ganglia are very visible as reddish brown masses; a large one in prothorax: this represents the cephalic and œsophageal: the prothoracic proper towards posterior margin of segments; then one each to meso-thorax and eight following segments; the last and largest of these, though in sixth abdominal segment, appears to belong to seventh and following segments, which are without ganglia.

The prolegs are of much interest, not in themselves, but when we compare them with those of the adult larva; they are on a rather thick cylindrical base, and have the usual "macro" form of one row of crotchets, facing inwards, thirteen to seventeen in number; on the anal claspers they are much smaller and few in number (nine), and are similarly in one row. The true legs are short and thick, and terminate in very curved claws. The head is small, about 2.5 mm. in diameter; it has in front—on epicranium, clypeus, and labrum—a number of short stiff hairs (none seen elsewhere on larva), the largest about .08 mm. in length. The antennæ are rather longer than this, but happen to be telescoped,—the second joint is not in evidence,—about .06 mm. long and .04 mm. thick, with a terminal armament of bristles, amongst which the third joint is not clearly discriminated. The head itself is rather dark in colour from being well chitinised (the true legs and crotchets are the only other dark chitinised parts); beneath it are three circles, carrying jointed palpus-like appendages; the central one is the largest, and represents probably the labium, though at first it looks very like the spinneret, with the other two as labial palpi. The two lateral ones, however, are probably the maxillary palpi, especially as they appear to have another, ill-developed process. The jaws are long, and cross one another for some distance, and each seems to consist of a straight conical process, with only one sharp terminal point—a simple spike or dagger, and not the flat-toothed jaws usual in leaf-eating Lepidoptera.

The large larva is a very different object. At first sight nothing could be less like a lepidopterous larva. Looking down on its back, we have an approximately flat surface, oval in form, rather narrower in front than behind, with a margin smooth, regular, uniform, and of same texture, &c., all round, no trace of segmentation, &c. Let us turn it over: it now lies on its flat dorsal surface, the dimensions of which, by the way, are 23 mm. \times 15 mm. It stands up above the surface about 5.6 mm., with a level, but not smooth top, but with smooth and sloping sides. The amount of the slope may be seen by the comparison of the top and bottom; the top (venter of larva) is 18 mm. by 7 mm., against the 23 \times 15 just mentioned. The slope is nearly nil at the head end, and by so much the more therefore elsewhere. The dorsum and sides are brown, hard, and chitinous. The sloping sides show little indication of segmentation, but at the

margin of the open (and soft) ventral area present a series of dark markings, very slightly raised on rounded elevations, but so shaded as to look very much so. As it now lies on its back, it is not unlike a Melton-Mowbray pork-pie, of perhaps unusual oval shape, and sides more than usually sloping, the resemblance being heightened by the brown (chitinous) crust-colour of the sides, and the dark markings representing the more baked marginal sinuations with which such pies are often ornamented. The lid of the pie is the small flat ventral area of the larva, slightly wider anteriorly, and presenting the head, legs, prolegs, &c. This area is pale and white, and is the only portion where any movement can possibly occur, the rest being a solid chitinous cap. Constructed as it is to permit this soft area to be absolutely covered and hidden on the surface on which the larva rests, one is surprised at its widening out above this area, quite regularly till, at a sudden sharp margin, the sides meet the flat top. The brown marginal marks are apparently two to a segment, certainly so at the sides where they are largest, and where a faint depression along the sloping sides seems to mark each segmental division. To see this, however, requires close examination, and some might say a little imagination.

Turning the larva over again, to examine the back more carefully, we find the margin very sharp, and slightly browner than the terra-cotta centre. Laterally and posteriorly it is a little hollowed within the margin. Across the middle are three very distinct lines, darker in colour, and with the surface in front of them decidedly higher than that behind. They occupy the middle two-fourths of the surface, but do not invade the fourths on each side next the margin. In front and behind these the indication of the segmental divisions are very obscure. A faint indication of a dorsal ridge exists in front of these lines. There are also a number of dots that appear to be obsolete hair-points, arranged in some degree as a transverse line across each segment, but with outlines enough to make such a statement a little doubtful or even misleading. The two segments marked out by the dorsal lines are the fourth and fifth abdominal.

The character of the sharp margin of the dorsal area wants a little more definite description. In the first place, the out-sloping sides, for their top millimetre, cease to slope, but become vertical; then inside the sharp border the surface descends again steeply, so as to form a sharp raised border to the central area. In front the inner slope soon bends into the flat dorsal area; behind it does so more slowly, resulting in the hollow above noticed; round this portion there is, inside as well as outside, the sharp margin, a breadth of about 1 mm., differentiated by a slight line from the general dorsal surface. Seen microscopically, the whole surface consists of very minute raised dots, each carrying a fine point; on the marginal flange surrounding the dorsum

these are modified into an arrangement that has just the appearance of overlapping fish-scales. The spiracles are difficult to find, in fact I have failed to find the thoracic spiracle; the abdominal ones are precisely where they are in the small larva, *viz.* on the flat dorsum, half-way between the median line and the margin; they are very small, and differ little in appearance from the hair-dots noted above; they are minute holes, with no marginal structure; some trace of the true spiracles can be seen at a little depth within them, accompanied by a scale-like outer margin.

(To be continued.)

BUTTERFLY COLLECTING IN SOUTHERN ANDALUSIA IN THE SPRING OF 1902.

BY REV. HENRY CHARLES LIANG, M.D., F.E.S., M.R.C.S., &c.

AFTER a marvellous recovery from a severe illness, the result of mental strain, I was ordered to get away for rest and change of scene, and found just what I required in the shape of an English chaplaincy at Jerez de la Frontera, in Andalusia. Starting from England on March 11th, I arrived at Jerez, *viâ* Paris, Madrid, and Seville, on Saturday, March 15th. For a few days, as the guest of Mr. W. Buck, British Vice-Consul, at his beautiful house 'El Palacio,' I had every advantage in the suggestion of likely localities. My collecting began after church-time on Sunday, March 16th.

Jerez is an exceedingly picturesque Spanish town, full of Moorish and mediæval remains of great interest, and with quaint old streets of dazzlingly whitewashed houses, lined with fragrant orange trees. The vegetation in the gardens and squares is that of the subtropical character common to Southern Andalusia, the palm trees in the Plaza Mayor being taller than any I have seen in Europe. The country round is, in point of scenery, not very striking, being of an undulating character rather than hilly. The soil is heavy, and the roads are very dusty in dry weather, and very sticky and muddy after rain. Vineyards and corn-fields are the chief features of the scenery; these are intersected by roads flanked on either side with hedges of cactus or of aloes. The latter are often the only shelter from the burning sun, there being very few trees of any size in the district.

On my first day's collecting, principally along one of the afore-mentioned roads, between the cactus hedges, I found *Thais rumina* (common), *Pieris brassicæ*, *P. rapæ*, *Colias edusa*, *Thestor ballus*, *Pyrameis atalanta*, *P. cardui*, *P. megæra*, and *P. egeria*.

During the next two days, on the latter of which I visited a small estate known as "El Pinal," where is a small forest of

gigantic umbrella pines, I added the following to my list:—*Papilio podalirius* var. *feisthamelii*, *Euchloë belemia* and var. *glauce*, *E. euphenoides*, *E. cardamines* (one), *Gonepteryx cleopatra*, *Chrysophanus phlœas*, *Callophrys rubi*, *Lycæna astrarche*, *Vanessa polychloros*.

During the first few days the weather was very hot—abnormally so, even for Andalusia; but during the last ten days of the month it became very unsettled and cloudy, with rain at frequent intervals, and with but little sunshine; my collecting, however, continued whenever opportunities occurred, but by the end of March I had only added to the list *Euchloë belia* and *Pieris daphidice* on March 24th, and *Papilio machaon* and *Lycæna icarus* on March 25th.

The commonest butterflies during this month at Jerez were *Colias edusa* and *Pyrameis cardui*, which seem to be very abundant throughout Andalusia. *P. atalanta* was also common, and appeared to be in quite a fresh condition. Apparently this species emerges early in the spring; none of the specimens appeared to have hybernated. *Pieris brassicæ* was also common everywhere.

From April 1st to 4th I collected at Ronda. I felt well repaid for my journey thither, not only on account of the interesting old place, with its wonderful rocky gorges 530 ft. deep in the centre of the town, and its lofty surrounding mountains, but also by reason of my successful collecting. I found a lovely spot about two miles south of the town on the banks of the Guadalevir, well wooded with olives, pines, and ilex, with a thick undergrowth of mytles and bay trees, and abounding with white and purple cistus and other beautiful flowers, precipitous rocks rising on every side; this was my daily collecting ground, and here I found butterflies in abundance. *Thestor ballus* was to be seen in great numbers, accompanied by *Callophrys rubi*, which I have never seen in such profusion, except at Digne, in Provence. *Gonepteryx cleopatra* was in great numbers, and added greatly to the beauty of the scene, at least in my eyes. *Euchloë belia* and *E. belemia* were also very common, but the chief prize was *E. tagis*, which was to be seen here in profusion. It is easily distinguished when on the wing from the other two species, being of much more feeble flight, and easier of capture. *E. belemia*, though very common, is not easy to take; it has a way of evading the net by a dexterous doubling movement, of which *E. tagis* seems to be incapable. *E. belia* also is a strong-winged species, and requires a great deal of negotiation, but *E. tagis* is easily taken; I took fifty specimens in two days, and might have taken very many times that number if I had chosen to do so. This was my first acquaintance with the typical form of the species; hitherto I had only known it in its Provencal form *bellezina*, from which it is very distinct. It is very constant,

and is not capable of being confounded with *E. belia*; most English writers have been rather at fault in their description of this species (myself included), but a personal acquaintance with it will leave no room for mistaking the hazy, clouded appearance of the markings of the under side, and the generally slender character of the insect as compared with the other species. The original figure of Hübner exactly represents it.

I found here *Leptidia sinapis* for the first time in Spain; large and lightly marked. Other species taken here were *Papilio podalirius* var. *feisthamelii*, *P. machaon*, *Pieris daphidice*, *Gonepteryx rhamni*, *Euchloë euphenoides*, and *Lycæna bellargus*. *Thais rumina* was also common.

Vanessa polychloros was seen several times at Ronda, flying about ilex trees; I mention this particularly, as it is marked in both editions of Staudinger's Catalogue "?And." The specimens taken appeared to be hibernated ones.

On my return to Jerez, on April 6th, I visited a range of low calcareous hills (Los Cruces) four miles to the south, overlooking the Atlantic, with views of Cadiz and Puerto S. Maria; there I found, in addition to the common species, *Lycæna lorquini* (very sparingly, however) and *Melanargia ines* just beginning to appear. *Syrichthus sao* was also taken.

The only other species taken during the rest of my stay at Jerez were *Epinephle pasiphaë*, which became after a time pretty abundant; and, in one spot only, *Melitæa ætheria*, now ranked as a good species in Staudinger's Catalogue, 1901. Of this I took a good series in fine condition on April 18th.

On April 12th I saw a specimen, in good condition, of *Argynnis latonia*, in the grounds of 'El Palacio.'

Two days were spent in Cadiz, but the weather was very unfavourable, with only a few gleams of sunshine. Yet, whenever the sun did shine, there were plenty of butterflies to be seen, though only common ones—*P. atalanta*, *P. cardui*, *C. edusa*, *P. rapæ*, *P. brassicæ*, &c. Several times observed *P. cardui* flying, moth fashion, round the gas-lamps at night.

On April 22nd I went to Malaga, where the environs are very beautiful, and suggestive of the presence of butterflies. Here in the hills of the Mediterranean littoral I found a fair number of species. *Melanargia ines* and *Epinephle pasiphaë* were abundant; *E. ianira* was beginning to appear, also *Cænonympha pamphilus*. Of *Lycæna bætica* two specimens were observed. I also saw two or three specimens of the very small form of *Colias edusa* var. *pyrenaica*, Gr. Gr., "fere duplo minor," Staudinger, 1901. Here also I took var. *helice*. *Epinephle ida* was also taken on April 29th. *Euchloë belemia* and *E. belia* and *Pyrameis cardui* and *atalanta* were common.

From Malaga I went up to Alhourhin el Grande, a village about ten miles northward; in the mountains here I hoped to

find *Zegris meridionalis*, but did not succeed in getting it. I found *Lycæna lorquini* in abundance in the higher regions, flying about thyme flowers in little groups. This is a good species, quite distinct from *L. minima*, and only occurs in Andalusia. I was in error in describing it in a former paper as occurring at Digne; I am now convinced that the Provencal specimens were only a small form of *L. sebrus*, from which this differs entirely.

From trying to do too much climbing after my recent illness, I unfortunately strained my knee-joint, and was unable to do as much collecting as I should have wished in this locality, which seems a very good one, but I took a few specimens of *Melitæa phæbe* var. *occitanica*, Stgr., on the higher ground, and, in addition, *Melanargia syllius* and *Pararge mæra* var. *adrasta*.

At Gibraltar, on May 2nd, I looked out for butterflies, and observed on the rock, and particularly at Europa Point, *Thais rumina* (one specimen), *Papilio machaon*, *C. edusa*, *P. atalanta*, *P. cardui*, *E. ida*, *E. ianira*, *P. megæra*, *Cænonympha pamphilus*, *Lycæna astrarche*, and *L. icarus*.

During one day's excursion in the woods near the waterfall at Algeciras, I found most of the common species, including *Euchloë belemia*, and took one specimen of *Lycæna melanops*.

The following is a list of the species taken in Andalusia from March 16th to May 3rd:—

- | | |
|---|---|
| 1 <i>Papilio podalirius</i> var. <i>feist-</i> | 22 <i>Melanargia syllius</i> . |
| 2 <i>P. machaon</i> . [hamelii. | 23 <i>M. ines</i> . |
| 3 <i>Thais rumina</i> . | 24 <i>Pararge megæra</i> . |
| 4 <i>Pieris brassicæ</i> . | 25 <i>P. mæra</i> var. <i>adrasta</i> . |
| 5 <i>P. rapæ</i> . | 26 <i>P. egeria</i> . |
| 6 <i>P. daphidice</i> . | 27 <i>Epinephele ianira</i> . |
| 7 <i>Euchloë belemia</i> and var. | 28 <i>E. ida</i> . |
| 8 <i>E. belia</i> . [glauce. | 29 <i>E. pasiphaë</i> . |
| 9 <i>E. tagis</i> . | 30 <i>Cænonympha pamphilus</i> . |
| 10 <i>E. cardamines</i> . | 31 <i>Callophrys rubi</i> . |
| 11 <i>E. euphenoides</i> . | 32 <i>Thestor ballus</i> . |
| 12 <i>Leptidia sinapis</i> . | 33 <i>Chrysophanus phlæas</i> . |
| 13 <i>Colias edusa</i> and var. <i>helice</i> . | 34 <i>Lampides boeticus</i> . |
| 14 <i>Gonepteryx rhamni</i> . | 35 <i>Lycæna astrarche</i> . |
| 15 <i>G. cleopatra</i> . | 36 <i>L. icarus</i> . |
| 16 <i>Pyrameis atalanta</i> . | 37 <i>L. bellargus</i> . |
| 17 <i>P. cardui</i> . | 38 <i>L. lorquini</i> . |
| 18 <i>Vanessa polychloros</i> . | 39 <i>L. melanops</i> . |
| 19 <i>Melitæa ætheria</i> . | 40 <i>Cyaniris argiolum</i> . |
| 20 <i>M. phæbe</i> var. <i>occitanica</i> . | 41 <i>Carcharodus alceæ</i> . |
| 21 <i>Argynnis latonia</i> . | 42 <i>Hesperia sao</i> . |

A CONTRIBUTION TO THE CLASSIFICATION OF THE COCCIDÆ.*

By T. D. A. COCKERELL.

MONOPHLEBINÆ.

Monophlebus, Leach.

Monophlebus, Leach, in Westwood, Arc. Ent. i. (1845), p. 22.
Type, *atripennis*.

Guerinia, Targ.-Tozz., in Signoret, Ann. Soc. Ent. France, 1875, p. 352. Type, *serratulæ*.

Drosicha, Walker, List Homop. Brit. Mus. Supp. (1858), p. 306. Type, *contrahens*.

Tessarobelus, Montrouzier, Ann. Soc. Linn. Lyon, xi. (1864), p. 246. Type, *guerinii*.

Llaveia, Signoret, Ann. Soc. Ent. France, 1875, p. 370. Type, *axin*.

Ortonia, Signoret, Ann. Soc. Ent. France, 1875, p. 367 (not *Ortonia*, Wood, 1869). Type, *uhleri*.

Protortonia, Townsend, Jn. N. Y. Ent. Soc. 1898, p. 169. Type, *primitivus*.

♀. Soft, somewhat elongated, more or less hairy, with powdery or cottony secretion. Legs and antennæ present; antennæ 11- (sometimes 9-) jointed; no long posterior ovisac. One species has 7-jointed antennæ.

♂. With fleshy caudal processes, arranged along the sides of the abdomen.

Species.—*M. dubius*, Fabr. (*fabricii*, Westw.), Sumatra; *M. atripennis*, Klug, Java; *M. leachi*, Westw., Malabar; *M. saundersi*, Westw., India; *M. burmeisteri*, Westw., India (?); *M. zeylanicus*, Green, Ceylon; *M. contrahens*, Signoret, China; *M. maskelli*, Ckll. (*burmeisteri*, Maskell, Tr. N. Z. Inst. xxix. p. 327), Japan; *M. corpulentus*, Kuwana, Japan.

M. illigeri, Westw., Tasmania; *M. crawfordi*, Maskell, Australia; *M. fuscus*, Maskell, Australia; *M. guerinii*, Montr., New Caledonia.

M. serratulæ, Fabr., Algeria; *M. fortis*, Ckll., Natal; *M. fulleri*, Ckll., Natal; *M. raddoni*, Westw., W. Africa.

M. axin, Llave, Mexico; *M. primitivus*, Townsend, Mexico; *M. mexicanorum*, Ckll., Mexico; *M. bouvari*, Signoret, Guatemala; *M. uhleri*, Signoret, Ecuador; *M. championi*, Ckll., Panama; *M. cacti*, Linné, St. Eustatius Island, Lesser Antilles.

Unfortunately, many of the species are known only in one sex. The genus may be divided into a number of sections, thus:—

(1.) *Monophlebus*, Leach. Male with two caudal appendages. *M. atripennis*, *M. dubius*.

* For tables of subfamilies and genera, see 'Canadian Entomologist,' October, 1899.

(2.) *Tessarobelus*, Montr. Male with four caudal appendages. *M. guerinii*, *M. championi*.

(3.) *Llaveia*, Sign. Male with eight caudal appendages; female antennæ 11-jointed. *M. axin*, *M. saundersii*.

(4.) *Drosicha*, Walk. Male with ten caudal appendages; female antennæ 9-jointed. *M. contrahens*, *M. maskelli*, *M. leachii*, *M. burmeisteri*.

(5.) *Monophlebulus*, Ckll. Female with antennæ 7-jointed. *M. fuscus*.

Stigmatococcus, Hempel.

Stigmatococcus, Hempel, Rev. Mus. Paulista, iv. (1900), p. 399. Type, *asper*.

Perissopneumon, Newstead, Ent. Mo. Mag. 1900, p. 250. Type, *ferox*.

♀. Antennæ and legs present; antennæ 7- to 8-jointed; abdomen with numerous marginal spiracles. Found in nests of ants.

Species.—*S. asper*, Hempel, Brazil; *S. ferox*, Newstead, India.

Lophococcus, Cockerell.

Lophococcus, Ckll., 'Entomologist,' 1901, p. 227. Type, *mirabilis*.

♀. Fixed, with a strongly chitinous skin, and a long erect spine on the middle of the back, this spine originating as an elevated fold of the skin. No ovisac.

Species.—*L. mirabilis*, Ckll., Natal; on *Mimosa*.

Palæococcus, Cockerell.

Palæococcus, Ckll., Canad. Entom. 1894, p. 36. Type, *fuscipennis*.

Crypticerya, Ckll., Psyche Suppt., 1895, p. 15. Type, *rosæ*.

Leachia, Signoret, Ann. Soc. Ent. France, 1875, p. 359 (not *Leachia*, Risso). Type, *fuscipennis*.

♀. Soft, convex, without an ovisac; genital aperture large, considerably anterior to the end of the body; antennæ with 9 to 11 joints.

♂. Without caudal fleshy tassels.

Species.—*P. fuscipennis*, Burm., Europe; *P. hellenicus*, Genadius, Attica; *P. irregularis*, Germ., *P. pinnatus*, Germ., and *P. trivenosus*, Germ., fossil in Prussian amber.

P. australis, Maskell, Australia; *P. nudata*, Maskell, Australia.

P. ewarti, Newstead, W. Africa.

P. braziliensis, Walker, Buenos-Ayres; *P. hempeli*, Ckll., Brazil; *P. rosæ*, Riley-Howard, West Indies, &c.; *P. mexicanus*, Cockerell—Parrott, Mexico; *P. townsendi*, Ckll., New Mexico; *P. pluchææ*, Ckll., New Mexico; *P. simplex*, Scudder, fossil at Florissant, Colorado.

Section *Mimosicerya*, Ckll. Female antennæ 9-jointed; skin strongly chitinous at the sides. *P. hempeli*.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE
AUCHENORRHYNCHOUS HOMOPTERA.

1902b

BY DR. H. J. HANSEN. *h*

(Continued from p. 217.)

The first pair of spiracles lies, as in the *Cercopidæ*, on the under side, a little within the lateral margin close to the posterior margin of the metasternum; the second pair lies at the antero-exterior angle of the second segment near the lateral margins, so that they are looking laterally and upwards. The third and eighth pairs of spiracles lie in the outer solid Pleural Plates, the fourth to seventh pairs in the anterior part of the narrow Plates in the inner part of the Pleuron. All the spiracles are small.

In the Membracinæ the abdomen, as is well known, is often elevated very considerably, compressed, and strongly chitinized, therewith following certain peculiarities in structure, and in the situation of the spiracles. As an example, the structure in *Centrotus cornutus* is now described. In this the tergite of the first segment is moderately feeble, somewhat peculiarly formed, and terminates a good way from the lateral margin; the sternite is longer and more solid than in *Tettigonia*, and is not interrupted medianly. The second segment's tergite is tolerably feeble and short, ends a good way from the lateral margin, and at its ends a small pleural plate is found. On both segments there is thus a somewhat large space between the lateral margins of the tergite and the sternite. As regards the second segment, the third segment's pleural plate and the lateral part of its tergite form together a strong solidly chitinized wedge, which fills up the space mentioned. On the third segment's tergite one sees at the anterior margin a deep transverse furrow, and in front of this an arched part, which one would readily take for the posterior part of the tergite of the second segment—which it is not—as this is situated in advance thereof as a more feeble short stripe. On the third to eighth segments the inner part of the Pleuron is only a somewhat narrow membrane, while its chitinized outer plate is very considerable. The first and second pairs of spiracles are consequent upon the peculiar structure and altered bodily form of the first segment, transferred considerably above the lateral margins, and look backwards; the second pair lie in the tiny pleural plate a little higher up than the first pair; the third to eighth pairs are transferred to the intero-anterior angles of the pleural plate.

In *Membracis tectigera* somewhat comparable circumstances are found, but here the pleural plates of the third to eighth segments are separated from the tergite and sternite only by a

feeble suture without proper membrane. *Æthalion reticulatum* accords, discounted by tolerably small peculiarities, essentially with *Tettigonia* in the structure of the first two segments, and in the situation of their spiracles; on the other hand, they agree essentially with *Centrotus* in the structure of the pleura of the third to eighth segments, and in the situation of their spiracles. ✓ *Ledra aurita*, on the contrary, agrees in all essentials with ✓ *Tettigoniæ*.

○ 4. *Fulgoridæ*.—The peculiar structural characters of this family are simplest and easiest to study in one of the large forms—for example, a species of the subgenus *Fulgora*—and a species of this genus is for that reason the basis of the following observations.

The tergite of the first segment, which is medianly indistinct and short, is laterally longer and well chitinized, and terminates a little from the lateral margin of the abdomen, which is membranous, externally limited and coalesced with a posterior and somewhat outwardly directed lateral part of the metanotum; the sternite is everywhere very short, but well chitinized, and extends right out to the lateral margins. The tergite of the second segment is broad medianly, and shortens considerably laterally up to the vanishing point, before it reaches right out to the lateral margins; the sternite is everywhere tolerably short, not very strongly chitinized, and does not reach right out to the segment's lateral margins, which are entirely membranous, but very short, as the pleura of the third segment and the outer part of its tergite extend forward as a—taken together—considerable oblique triangular formation on the lateral parts of the abdomen. The sternites of the first and second segments, together with a large part of that of the third segment, are covered, as seen from below, by the posterior coxæ and trochanters. The dorsal tergites of the third to eighth segments reach, as usual, out to the lateral margins, whereas their sternites (of which the eighth is modified for the service of the genitalia) extend somewhat farther out laterally than in the above families. The pleura are broad, and consist of a lower, well developed, but, however, not especially broad (in *Fulgora ventral*) chitinous plate, and a usually broader, upper, lateral part, which may be noted as typically membranous, appears as such in many forms (for example, *Megamelus*, *Issus*), but in *Fulgora* presents a somewhat irregularly formed, strongly chitinized portion near its lower margin.

The first pair of abdominal spiracles lies on the ventral part of the segment in front, and partly exterior to the end parts of the first segment's tergite, and behind and within the backwardly directed lateral parts of the metanotum; this is in *Fulgora* considerable and transverse. The second pair of spiracles also lies ventrally at a very considerable distance from the lateral margins behind the lateral part of the first tergite, thus more approaching the

insect's middle plane than the first pair does; it is a little larger than the latter, and also transverse. *The third to eighth pairs lie at the side of the insect* in the membranous part of the pleuron close to their solid chitinization; they consist of oblique, apically downwards inclining fissures, and are all large, the first three pairs the biggest, and about the size of the dorsally-situated second pair.*

Deviations from this dorsal structure in the other Fulgoridæ examined by me appear to be tolerably feeble, and of subordinate significance. Some more essential examples may be mentioned. In *Aræopus crassicornis* the first and second pairs of spiracles are proportionately importantly smaller, and (as it seems) shorter and broader than in *Fulgora*; their situations with regard to the outer part of the metanotum, and with regard to one another, are the same; the third to eighth pairs lie in the solid part of the pleuron, which here, on account of the breadth of the sternites, looks laterally just like the upper membranous part. In *Eurybrachys* sp. the third to eighth pleura are very broad, but a chitinized lower part is not particularly developed—at least the pleura are everywhere membranous without special differentiation in the quality of the skin. In *Tettigometra costulata* the second tergite has nearest to the lateral margins a very considerable length, and its ovate spiracle lies in the tergite itself; but the relative situations of this and the first pair are as in *Fulgora*; the spiracles of the third to seventh pairs lie a little inwardly in the solid part (of the pleura), which turns obliquely outwards and downwards; on the eighth segment the solid spiraculiferous pleural part is coalesced with the sternite. The peculiar Flatidæ, with elevated, compressed abdomen, accord essentially with the medium-sized Fulgoridæ.

A résumé of this well-marked family may be stated as follows: the dorsal situation of the first and second pairs of spiracles, the location of the first pair in the angle of the metanotum, the looking outwards essentially or totally of the third to eighth pairs of spiracles situated in the pleura, which are either in great part or totally lateral, and consist of an upper essentially or quite membranous part, and a lower portion, which is mostly strongly chitinized.

* Judging from observations on these lateral spiracles in *Calypso proctus*, their structure is very peculiar, but I have reason to believe that their formation is not uniform in the different forms of Fulgoridæ; so that I entirely omit a description here, as I am not able to make it complete.

(To be continued.)

ON SOME NEW GENERA AND SPECIES OF HYMENOPTERA (ICHNEUMONIDÆ, CHRYSIDIDÆ, FOSSORES, AND APIDÆ).

By P. CAMERON.

(Continued from p. 208.)

SCOLIIDÆ.

TIPHIA SPINOSA, sp. n.

Nigra, alis flavo-hyalinis, nervis fuscis, stigmatibus nigro; metanoto striolato; petiolo subtus spinoso; mandibulis palpisque nigris. ♂. Long. 12 mm.

Hab. Khasia Hills (coll. Rothney).

Antennæ short, stout; the scape closely and distinctly punctured, sparsely covered with fuscous hair; the flagellum covered with a pale microscopic down. Front closely, strongly, and uniformly punctured; the vertex has the punctures more irregularly distributed, larger and more widely separated; both are thickly covered with white hair. Clypeus closely punctured, and thickly covered with white hair; in the middle is a slight incision. Mandibles black, shining; the base closely punctured, thickly covered with silvery hair; the palpi dark testaceous. Pronotum closely and strongly punctured, its apex smooth; behind the basal keel obscurely longitudinally striated. Mesonotum with large deep moderately widely separated punctures; the scutellums are similarly punctured. On the median segment are three keels; the central is straight, the outer more irregular; the space between them is strongly shagreened, and irregularly transversely striated; the space outside them is irregularly reticulated and striated; on the apex are three short stout keels, the inner of which does not reach to the transverse apical keel; the outer converge at the base. The apex is coarsely shagreened, irregularly reticulated, and round the edges striated; the keel bounding the top is stouter than usual; on the sides near the middle, extending half on to the notum and half on to the pleuræ, is a large deep ovate depression with raised sides; inside it is shagreened. Propleuræ closely striated; the top punctured, the apex smooth; mesopleuræ strongly but not closely punctured; metapleuræ strongly striated; the base largely and deeply excavated on the upper part, the lower part strongly shagreened. Mesosternum rather strongly but not closely punctured, thickly covered with a pale pubescence, and with long fuscous hair; the middle has a broad rounded furrow. Legs thickly covered with silvery pubescence; the spines rufous. The radius has an oblique slope at the base; the second transverse cubital nervure has a rounded outwardly curved slope; the first recurrent nervure is rounded outwardly at the top, and is received almost in the middle of the nervure. The petiole is strongly but not closely punctured at the apex; the base of the second segment has a narrow strongly and closely striated depression; the other segments are punctured, the punctures becoming stronger and closer towards the apex; the apical segments are thickly covered with pale pubescence. The base of the first ventral segment bears a stout

curved, somewhat triangular, spine; the apical part of the segment is strongly shagreened; on the sides are two or three large irregular foveæ; the apex is furrowed and stoutly longitudinally striated. The pygidium is coarsely punctured; the epipygium is coarsely punctured, with a smooth shining band in the middle; the ventral segments are fringed with bright golden hair.

A species easily known by the tooth on the base of the petiole, by the stoutly transversely striated middle of metanotum, and by the stoutly striated base of the second abdominal segment.

TIPHIA CURVINERVIS, sp. nov.

Long. 14 mm. ♀.

Hab. Khasia Hills (coll. Rothney).

Agrees closely in form and coloration with *T. fulvinervis*, but is smaller; may readily be separated from it by the second transverse cubital nervure being roundly curved at the top, the whole nervure being of the shape of a reaping-hook.

Space of antennæ thickly covered with long pale fulvous hair; the flagellum with a pale pile, its last joints rufous. Front and vertex strongly and deeply but not very closely punctured, and sparsely covered with long pale fulvous hair; the keel over the antennæ is large, but not stout, and is bluntly conical. Face and clypeus closely and somewhat strongly punctured; the apex and the middle of the clypeus smooth. Mandibles rufous in the middle, fringed below with long pale golden hair. The basal slope of the pronotum is closely and distinctly punctured; the basal half of the upper part bears large deep punctures; the apical is smooth; the whole is thickly covered with long white hair. Mesonotum bearing large deep scattered punctures, the sides impunctate in the middle. Scutellum with some large deep punctures on the apex; the post-scutellum similarly punctured at the base. Median segment coarsely shagreened, more strongly between the keels; of these there are three; the outer are curved outwardly at the base; the inner reaches near to the apex; the oblique slope is strongly shagreened, is thickly covered with a short white pile, and is irregularly punctured and striated round the edges. Propleuræ longitudinally striated; above the striæ are thinner, more irregular, and are intermixed with punctures. Mesopleuræ rugosely punctured, thickly covered with white pubescence. Metapleuræ closely striated, except at the base, which is broadly shagreened. Basal half of the mesonotum strongly punctured; the apical smooth; the apical area narrowed at the base, the narrowed part deeply furrowed; there is a triangular depression in the middle at the base; the sides have a few punctures. Legs thickly covered with glistening silvery hairs; the spines are rufous. Wings fulvo-hyaline, the hinder pair paler at the apex and behind; the nervures and stigma are fulvous. The base of the radius is straight, and has an oblique slope; the upper half of the second transverse cubital nervure has a round outward curve; the lower half is almost straight, oblique; the first transverse cubital nervure has a rounded outward curve at the top; the second has an oblique slope, and is received near the base of the apical third.

Abdomen shining, sparsely punctured; the apical segments thickly covered with long white hair; the basal half of the pygidium is strongly punctured, and is thickly covered with long pale fulvous hair; the apex is smooth, rufous, and is keeled down the middle; the epipygium is closely and finely punctured.

TIPHIA BICARINATA, sp. nov.

Nigra, punctata, longe hirsuta; alis fusco-violaceis; metanoto bicarinato. ♂. Long. 16 mm.

Hab. Japan (George Lewis).

This species is larger than any of the recorded Japanese species, from which it differs (as it does also from the Indian) in having only two keels on the median segment.

Scape of the antennæ shining, bearing large deep punctures and long pale fulvous hairs; the basal three joints of the flagellum shining, thickly covered with glistening fulvous hair; the rest of the flagellum opaque, covered with a dull pale down. Front and vertex closely and strongly punctured; there is a smooth space on the outer side of the hinder ocelli, which is continued across behind them by a space having only a few small punctures; the part immediately behind the ocelli is strongly punctured. Front thickly covered with long, the vertex with shorter, fuscous hair; in front of the ocelli there is a smooth space—somewhat dagger-shaped in form—broad at the base, narrowed and sharply pointed at the apex. Clypeus smooth and shining in the middle; the base and sides shagreened. Mandibles broadly piceous in the middle; the lower side fringed with long pale golden hair at the base. The pronotum on the perpendicular base closely punctured, except on the lower side in the middle; the upper part coarsely punctured, except a broad somewhat curved space at the base. The middle of the mesonotum is slightly depressed, closely and coarsely punctured, the sides are bordered by a row of large deep punctures, closely united together, followed inwardly by a row of larger ones, fewer in number, and more widely separated; inside of these again is a smooth space, with a large puncture near its centre. Scutellum closely punctured at base and apex, the middle smooth. Median segment shagreened, opaque, finely longitudinally aciculated at the apex; in the middle are two stout keels, which hardly converge towards the centre. The base of the propleuræ bears moderately large punctures, closely united together at the extreme base, widely separated and scattered over the rest; the lower half is closely obliquely striated, the striæ somewhat coarser towards the apex; the whole shining. Mesopleuræ strongly punctured, opaque, thickly covered with long white hair. In the middle of the metapleuræ is a shallow curved furrow; the upper part at the base strongly obliquely striated; the lower smooth, very finely striated; the apex is also finely striated. Legs black, the projection on the apices of the femora piceous; the coxæ, trochanters, and femora smooth, sparsely covered with soft white hair; the fore tibiæ slightly, the four posterior very thickly, covered with white hair; coarsely punctured on the outer, smooth on the inner side; the outer row of broad spines pale and fulvous; the calcaria testaceous. The petiole shining, smooth, covered with long fuscous hair, more sparsely

towards the apex; the second and third segments sparsely and shallowly punctured; the fourth much more coarsely and closely; the fifth rugosely punctured; the pygidium coarsely longitudinally striated, intermixed with some coarse punctures; its apex finely, closely, longitudinally striated. The basal ventral segment punctured at the base; the second coarsely, the others more finely and closely punctured; the second smooth; the third and fourth aciculated at the base; the last rugosely punctured. Wings fusco-hyaline; the nervures and stigma deep black.

POMPILIDÆ.

SALIUS HIMALAYENSIS, sp. nov.

Niger, capite thoraceque dense aureo pilosis; pleuris brunneis; apice abdominis late rufis; pedibus rufis, coxis trochanteribusque brunneis; alis flavo-hyalinis. ♀. Long. 15 mm.

Hab. Khasia (coll. Rothney).

A species closely related to *S. flavus*. The differences between the two may be best shown in synoptical form:—

Second cubital cellule at the top distinctly shorter than the first; the pleuræ and median segment black; the femora broadly black at the base	<i>flavus</i> .
Second cubital cellule equal in length to the first; the pleuræ and median segment brownish; the femora without black	<i>himalayensis</i> .

Antennæ pale fulvous, the scape darker in tint. Head dark ferruginous; the vertex, front, and face densely covered with golden pubescence, the face bearing also some long rufous hairs. The apex of the clypeus is broadly rounded, closely punctured, except on the extreme apex. Mandibles dark ferruginous, the teeth black, the extreme base covered with depressed golden pubescence. The greater part of the prothorax and the mesonotum densely covered with depressed golden pile; scutellum minutely punctured, and covered with rufous hair. Median segment irregularly transversely striated, sparsely covered with black hair; the base and apex black; the middle with a wide shallow furrow. The propleuræ are of a brighter colour than the meso-; the metapleuræ darker; the mesopleural furrow is narrow; the metapleuræ irregularly obliquely striated. Legs ferruginous; the coxæ blackish behind; the tarsi are paler; the hinder femora darker. Wings yellowish hyaline; the apex slightly infuscated; the first and second cubital cellules are equal in length on the top. Abdomen black, shining; the apical two segments ferruginous, and thickly covered with long rufous hairs.

POMPILUS SETABIS, sp. nov.

Black, the under side of the scape white, of the basal joints of the flagellum brown; the apex of the median segment densely covered with white pubescence; wings hyaline, the apex smoky; the third cubital cellule petiolated. ♂. Long. 8 mm.

Hab. Borneo.

Antennæ stout; the apical joints of the flagellum roundly dilated; the basal three joints brownish; the scape for the greater part white

beneath. Head densely covered with silvery pubescence, thickest on the front and clypeus. Eyes long, slightly converging above; the ocelli are in a curve; the hinder are separated from each other by a slightly greater distance than they are from the eyes. Clypeus at the apex transverse in the middle; the labrum large, the palpi black. Thorax densely pruinose; the apical slope of the median segment is densely covered with woolly hair, silvery white in colour. Legs densely pruinose; the tibial and tarsal spines long and black; the calcaria white; the longer of the hinder pair is two-thirds of the length of the metatarsus. Wings hyaline; the apex of both wings infuscated; the radial cellule short, wide; the third cubital cellule is petiolated; below it is as long as the second; the first transverse cubital nervure is broadly and roundly curved; the first recurrent nervure is received close to the transverse cubital; the second shortly beyond the middle of the cellule; the accessory nervure in the hind wing is received behind the cubital. Abdomen sessile; the basal segments densely covered with silvery pubescence; the apical segment bluntly pointed.

(To be continued.)

NOTES AND OBSERVATIONS.

ARE COCOONS WATERPROOF?—The question is suggested by my experience of the disastrous rain-storm at Ipswich on July 1st. I had a chrysalis of *Odonestis potatoaria* in the cocoon on a stem in a tall glass jar, which stood in a sheltered position near a wall. To my surprise next morning I found the jar was filled with water to the depth of five inches (a fact which indicates the greatness of the deluge), and I concluded the chrysalis was drowned, and threw it aside. Two days later, when it was dry, curiosity caused me to open the cocoon, and I found the pupa alive and kicking! Considering that it must have been nearly twenty hours under water, I thought the incident worthy of record, and should be interested to hear of similar experiences. CLAUDE A. PYETT; 28, Waterloo Road, Ipswich.

ICHNEUMON IN *ZYGÆNA TRIFOLII*.—In July, 1901 (when in search of *Aporia cratagi*), I came across a fresh locality for *Z. trifolii*, and the examples appeared to be of a more blotched character than those I usually get. This year I went to the spot in June in order to collect a number of cocoons, and to my surprise I found that there were two distinct sizes, one about one-third the size of the other. In about a couple of hours I collected 400 cocoons, and after I reached home I separated the two sizes, and found there were 275 small ones and 125 large ones. Several small larvæ (typical *trifolii*) spun up while in my possession, and were amongst the 275. I thought there must be two species, and anxiously waited for their emergence. Alas! I was disappointed, for the large cocoons produced very normal *Z. trifolii*, and the smaller ones were all ichneumonid, with three exceptions, which produced very dwarfed *trifolii*. The percentage of ichneumonid cocoons (68·75 per cent.) seems exceptionally great, for in another place I

found the cocoons of *Z. filipendulæ* very plentifully, and, having collected five hundred in a very short time (getting as many as six on one stem of grass), only two ichneumon flies emerged, or a percentage of '04, but unfortunately vars. were represented by a percentage of '000. Should anyone visiting Margate find that either of these species of *Zygana* is a pest, he may blame me for having introduced them in any numbers. I shall be glad to show anybody interested in ichneumon flies the two sizes of cocoons.—J. P. BARRETT; St. John's Villas, Margate.

PIERIS NAPI TWELVE MONTHS IN PUPA.—During June last several specimens of *Pieris napi* emerged from chrysalids of June, 1901. For some reason they did not emerge as second brood last year, and their colouring is of the spring type.—C. A. SLADEN; The Rectory, Alton Barnes, Pewsey, Wilts, August 6th, 1902.

PLUSIA MONETA: A FEW NOTES AND QUERIES.—The above species was first discovered, I believe, in this country in 1890; odd specimens were captured or bred every year in and about the county of Kent by different collectors and duly recorded, the insect being looked upon as a great prize. In 1900 a good number of the larvæ were discovered and successfully bred; in 1901 a larger quantity of the larvæ were found and more captures recorded, but this season, I think, has eclipsed all previous records; it has appeared all over London, practically wherever its food-plants (*Aconitum* and *Delphinium*) are cultivated; and when one reviews its career from the time it first appeared, we must admit it has apparently firmly established itself, at least in Kent; but will it last? I should never be surprised to hear of its sudden disappearance; therefore, on behalf of all concerned, I think it would be most interesting if some of our brother enthusiasts, older and more experienced than I, would give us their valuable opinions *re* this species through the medium of this Journal. In the meantime, I would strongly advise those collectors who have not yet got this handsome insect to add it to their collections while it is—as a friend of mine rightly or wrongly puts it—so awfully “common”!—A. J. LAWRENCE; 65, Malyon Road, Ladywell, S.E., Aug. 16th, 1902.

GYNANDROUS ARGYNNIS PAPHIA.—Whilst staying at Brockenhurst, in the New Forest, last month, I was fortunate enough to capture, on July 28th, a very good specimen of *A. paphia* (hermaphrodite). It was at rest on bramble-blossom, and was quite easily seen, due to the distinct shades of colour. The right side is male, and the left female; each half of head, thorax, and body also corresponds to the sex.—HERBERT CHARLES; Woodend, Torrington Park, North Finchley, Aug. 15, 1902.

UNUSUAL PAIRING OF BUTTERFLIES.—I think the following is worth recording. On July 15th last I found a male *Eurytela hiarbas* in cop. with a female *Neptis agatha*. I had not a net with me, but managed to secure both insects with my hand. I kept the female *N. agatha* alive in the hope of getting some ova, but unfortunately she would not lay in confinement. Is it not very unusual for two such distinct species to pair? I shall be pleased to know if any other collector in Africa has ever found these two insects *in cop.* I may mention that

N. agatha has been unusually abundant here this season, and *E. hiarbas* not nearly so common as during the two previous seasons. — G. F. LEIGH; Heathfield, Sydenham Road, Durban, Natal, July 26th, 1902.

CAPTURES AND FIELD REPORTS.

LYCÆNA MINIMA VAR. ALSOIDES IN HAMPSHIRE. — Mr. B. Piffard reports the capture of this large form of *L. minima* on the coast near Lymington, and he has kindly presented a pair to the National Collection of British Lepidoptera. It should be mentioned that Mr. Piffard states that there is no chalk or limestone in the district where he obtained the specimens.

APORIA CRATÆGI IN KENT. — This butterfly, I am pleased to record, still survives in my neighbourhood. Early in July I caught a fresh male on a small patch of clover, which proved to be the "home" of a batch of the insect, for on subsequent days I very easily took nineteen more, making exactly a score. I also saw about another score specimens on the "rampage," but at such time *A. cratægi* is not easy to capture, for the wind takes it along at a terrific pace, and I can only account for six examples captured away from the "home"; the greatest distance between specimens captured was about ten miles. I am inclined to think the insect is domiciled in the fruit orchards. I failed to get eggs, though one female, taken *in cop.*, lived over a fortnight under artificial conditions. I kept two females and a male together with the proper food-plants and fed them regularly, but to no purpose. — J. P. BARRETT; 3, St. John's Villas, Margate.

PIERIDÆ IN LONDON. — In the daily papers one occasionally sees letters from astonished correspondents recording the appearance of a butterfly in London. It is doubtful whether these occurrences are quite as rare as is generally supposed. It may, however, be worth mentioning that on June 19th, at about 4.30 p.m., I saw a specimen of *Pieris brassica* in Northumberland Avenue. There was at the time a strong breeze coming off the river, and, after vainly struggling towards a plane tree, the butterfly got blown towards Trafalgar Square. The flowers in the window-boxes at the Métropole had been changed that morning, and the specimen may have been accidentally imported with them. I saw another specimen of *P. brassica* in Northumberland Avenue on June 24th. Earlier in the season I saw, but was not near enough to identify accurately, a *Pieris* in St. James's Park. — D. P. TURNER; 2, Shalston Villas, Surbiton, July, 1902.

PLUSIA MONETA IN HAMPSHIRE. — Four larvæ of *P. moneta* were taken here during the last week in May from plants of *Delphinium*. The moths successfully emerged between June 28th and July 9th. It would be interesting to learn in what form this species passes the winter. It seems reasonable to suppose that the eggs from which these larvæ were produced were laid last July, since the patch of *Delphinium* was that over which a specimen of the perfect insect was

then taken. But in the autumn the plants die down to the roots, and in the spring the whole of the surface of the ground was disturbed several times. It seems difficult, therefore, to imagine how either eggs or hibernated larvæ could survive.—G. W. RUSSELL; Portchester, Hants, July 26th, 1902.

PLUSIA MONETA IN WILTSHIRE.—I have to report the capture of *Charocampa porcellus* and *P. moneta* at honeysuckle on the evening of July 17th last.—C. A. SLADEN; The Rectory, Alton Barnes, Pewsey, Wilts.

PLUSIA MONETA AT WINCHMORE HILL.—On the evening of August 6th a fine specimen of *P. moneta* flew into the room where there was an incandescent light burning.—B. HICKLIN; Cranford, Winchmore Hill.

PLUSIA MONETA IN SURREY.—On July 14th a specimen of this moth was captured flying over *Delphinium* in a garden at Sutton, and forwarded to me. From that date down to the time of writing (August 1st) twelve more specimens have been taken in the same garden, the later captures showing signs of being worn. The species has evidently "come to stay," and there is perhaps no necessity for further detailed records. Nevertheless, I venture to forward this record, in order that the spread of the species throughout the counties may be noted for future reference. I may add that two of the specimens have laid eggs, and that an attempt will be made to feed up the larvæ when they hatch.—R. MELDOLA; 6, Brunswick Square, W.C., Aug. 1st, 1902.

COLIAS EDUSA IN ESSEX, 1902.—On August 10th, a very hot day, three *C. edusa* were seen, and one of these was captured.—RICHARD J. FITCH; Brick House, Maldon, Essex.

LASIOCAMPA QUERCIFOLIA IN LONDON.—On July 29th I took a fine female specimen of this moth, resting on a window-frame of a restaurant in the Euston Road, N.W., about 10.45 p.m. On arriving home, a few minutes later, I found it had already deposited about a dozen eggs. As the moth was so fresh I killed it, thinking that the ova would be infertile. To my surprise, on August 12th I found nine larvæ had hatched, and these are feeding all right up to the present.—H. PERKS; 43, Charlotte Street, Portland Place, W., Aug. 17th, 1902.

RHODOPHÆA FORMOSA AND ONCOCERA AHENELLA IN HERTS.—Among some Lepidoptera sent to me for identification by Mr. Philip J. Barraud, of Bushey Heath, were three specimens of *R. formosa* and one male example of *O. ahenella*.—RICHARD SOUTH.

CHROSIS BIFASCIANA IN SURREY.—So far as I am aware, Reigate and Haslemere are the only localities in Surrey from which this species has previously been recorded. On July 12th last, whilst netting a few specimens of *Batodes angustiorana* at Box Hill, I secured one example of *C. bifasciana* (*audouinana*).—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

PIONEA (EBULEA) STACHYDALIS IN SURREY.—I took two examples of this species in the Esher district on July 18th last. They were disturbed from herbage among which were a good many plants of *Stachys sylvatica*.—RICHARD SOUTH.

THE BUTTERFLIES OF THE WITHERSLACK DISTRICT.—In one of the Lancaster local papers there appeared recently a short article stating that nearly all the British butterflies occurred at or in the vicinity of Witherslack, Westmoreland. A list of the different species which do occur in that district will no doubt be interesting, and serve as a guide for intending entomological visitors. No less than thirty-nine species occur or have been taken in the neighbourhood, out of a grand total of seventy-two. This is undoubtedly a fine list for one locality, especially when we consider that, of the remaining thirty-three species, fourteen are either very rare or only occasional visitors to our shores—e. g. *A. cratægi*, *P. daplidice*, *C. hyale*, *A. latona*, *A. niobe*, *A. dia*, *M. didyma*, *V. antiopa*, *V. virginensis*, *D. erippus*, *S. ligea*, *P. virgaureæ*, *L. bætica*, and *L. acis*, while one, *C. dispar*, is practically extinct, and eight are local,—*P. machaon*, *M. cinxia*, *A. iris*, *L. pruni*, *L. arion*, *H. lineola*, *H. actæon*, and *C. palamon*.

The following is a complete list of the Rhopalocera of Witherslack and district:—

Pieris brassicæ, *P. rapæ*, and *P. napi*. Common everywhere.

Euchloë cardamines. Common, end of May, in the lanes, Grange, Methop, Witherslack, &c.

Leucophasia sinapis. Common, near Witherslack and at Methop; only one brood, end of May.

Colias edusa. Common at intervals, in “*edusa* years.”

Gonepteryx rhamni. Common in lanes about Witherslack.

Argynnis selene. This species was formerly common on a piece of waste swampy ground near Witherslack, but cultivation and drainage are gradually stamping it out.

A. euphrosyne. Common, beginning of June.

A. aglaia. Not common, occurs about Witherslack sparingly; at Warton Crag it is fairly common, also on Arnside Knott.

A. adippe. Common during July and beginning of August.

A. paphia. Rare; I took one specimen near Witherslack last year—a record. This was no doubt introduced with farm produce.

Vanessa polychloros. Rare; one specimen taken by myself last year. The same remark applies to this as to *A. paphia*, vide supra.

V. urticæ. Common everywhere.

V. io. Abundant. This is the commonest butterfly about in August.

V. atalanta. Fairly common.

V. cardui. Not quite so plentiful as *V. atalanta*.

Erebia epiphron. Common on the Langdale Pikes, Helvellyn, &c.

E. athiops. Common, beginning of August.

Pararge megæra. Common, May, June, July, and August, sunning itself on the walls.

Satyrus semele. Common, end of July and beginning of August, on rocky ground.

Epinephele ianira. No remarks needed.

E. tithonus. Odd specimens have been taken, but this species is rare; the nearest locality is near Heysham, on the Overton Road; end of July and beginning of August.

E. hyperanthus. Was formerly common in Maud's Wood, near Grange, but a hydro now stands there, and the grounds are enclosed and private. It has been taken near Kendal, but is evidently scarce.

Cænonympha dorus. Very common, end of June to mid-July, on all the mosses.

C. pamphilus. Vide *E. ianira*.

Thecla betulæ. Local; occurs on the Silverdale road, beginning of September.

T. quercus. Common about the oaks on Arnside Knott, mid-July.

T. rubi. Common during May.

Chrysophanus phlæas. Common, odd specimens everywhere.

Lycæna agestis. Fairly common, also var. *salmacis*.

L. icarus. Common; the second brood in September is diminutive.

L. corydon. Formerly common near Arnside Tower; also occurs on Warton Crag.

L. argiolus. Common; only one brood, end of May.

L. minima. Local; I only know of one locality, on the roadside, near the 'Derby Arms,' Witherslack.

Nemeobius lucina. Common, near Grange, end of May.

Nisoniades tages. Common on most of the heaths.

Hesperia sylvanus. Common.—C. H. FORSYTHE; Lancaster.

FIVE DAYS' COLLECTING AT DEAL.—Arrived at Deal on the morning of June 25th for five days. I was met at the station by a trap, which was to take me to my destination, Martinsfield, which is two and a half miles from the station, and is situated in the middle of the Deal sandhills. As we drove along I noticed a very large pair of *Cerura vinula* on a telegraph pole. After lunch I started off in quest of *Callimorpha dominula*, but was at first unsuccessful in finding the exact locality, which was not discovered until we again visited the spot on the next day. The larvæ were then found fairly commonly, feeding on nettle, bramble, sloe, and several low plants, though the majority were on the first two.

Porthesia chrysorrhæa larvæ were abundant on blackthorn, and single examples were also taken all round Deal. *P. similis* was not nearly as common as its usually far rarer relative. Larvæ of *Malacosoma neustria* were abundant on fruit trees at Worth and Sandwich, and odd larvæ of *L. quercus* were also picked up. The full-grown larvæ and cocoons of *Anthrocera filipendulæ* were very thick, both on the chalk at Kingsdown and in a certain spot on the sandhills; whilst two freshly emerged *A. trifolii* were also obtained. The much-eaten mallow produced larvæ of *Eubolia cervinata*, but searching for *Cucullia verbasci* produced only two small larvæ on *Scrophularia* (figwort), which was very abundant in the ditches on the sandhills and near Sandwich, where the larvæ were taken.

The most notable butterflies were *Pyrameis cardui* and *Cupido minima*; the first-named was quite common, but, of course, in very poor condition. As for *C. minima*, it abounded on the chalk around Kingsdown and Martin Mill. Five or six were often to be seen in company flying over low bramble bushes in some sheltered corner. Those taken were mostly in perfect condition. I have never known the species anything like so common before. Other butterflies noticed were *Pieris brassica*, *P. rapæ*, *Vanessa urtica* (also larvæ of all sizes), *V. atalanta*, *Epinephle ianira*, *Cænonympha pamphilus*, *Polyommatus phlæas*, *Cyaniris argiolus*, *Lycæna icarus*, *L. adonis* (a few males in grand condition), *Thanaos tages*, and *Hesperia sylvanus*.

The posts forming the uprights of the post and rail fences, so common in this part of the country, were well worth searching, especially for Noctuæ. At Kingsdown, *Hecatera serena* was the commonest moth taken in this way, whilst on the sandhills, where *Silene* is not so much in evidence, *Cucullia umbratica* was an easy first, about twenty being taken in an hour, and nearly all in first-rate condition. Other species thus obtained were *Dianthæcia conspersa* (one at Kingsdown), *Mamestra brassicæ*, *M. albicolon*, *M. anceps*, *Xylophasia polyodon*, *X. lithoxylea*, *Apamea gemina*, *Hadena dentina* (abundant), *H. oleracea*, *H. genistæ* (one), and *Hepialus lupulinus*.

A few *Arctia villica* were met with, and other insects taken or noticed by day-work were *Dianthæcia capsicola*, *Aplecta nebulosa* (one), *Plusia gamma* (fairly common), *Euclidia* *mi*, *Phytometra ænea*, *Spilosoma lubricipeda*, *Melanthia ocellata*, *Melanippe galiata* (Kingsdown), *M. montana* (Martin Mill), *M. subtristata*, *Campptogramma bilineata*, *Acidalia ornata*, *A. marginepunctata* (one only, at Kingsdown), *Asthena candidata*, *Cabera pusaria*, *Metrocampa margaritaria* (Worth), *Cilaria truncata*, *Lomaspilis marginata*, *Phibalapteryx vitalbata* (near Sandwich and Martin Mill), *Eupithecia rectangulata* (two, Deal and Worth), *Pionea forficatalis*, *Pyralis costalis*, *Pyrausta purpuralis*, *Eurrhyncha urticata*, *Scopula olivalis*, *Ebulea crocealis*, *Cataclysta lemnata* (abundant, Sandwich), *Scoparia dubitalis* (abundant), and *Botrys pandalis*.

At night we treaced rows of posts on the sandhills. The first night turned out a blank, and, though there was a somewhat strong north-easterly wind on the other nights, there were plenty of insects at the sugar, especially on the last night. They were mostly, however, of the commonest. As soon as the treacle was on, and before it was quite dark, *Cherocampa porcellus* turned up in grand condition, but only two of them. The following were also attracted:—*Agrotis exclamationis* (far and away the commonest moth), *A. corticea* and *A. segetum* (both scarce), *Xylophasia polyodon*, *X. sublustris* (one), *Leucania comma* (abundant and fine), *L. pallens*, *Mamestra brassicæ*, *M. albicolon* (at first mistaken for *brassicæ* and passed over, but afterwards we obtained about a dozen, mostly in fine condition), *M. anceps*, *Miana strigilis* (dark forms with some reddish markings), *M. fasciuncula*, *Grammesia trigrammica*, *Apamea gemina* (not common), *Triphæna pronuba*, *Hadena chenopodii*, *H. oleracea*, and a few *Cucullia umbratica*, which I believe is not generally taken at sugar. Last, but not least, a fine *Neuria reticulata*. Light attracted, among commoner things, *Arctia villica*.

The Odonata were not particularly interesting, only seven species being noticed—viz. *Libellula quadrimaculata* and *L. depressa* (one of each), *Brachytron pratense*, *Platynemis pennipes*, *Pyrrhosoma nymphula*, *Agrion puella* (abundant), and *Ischnura elegans* (abundant).

A few species of Coleoptera were taken. The best were single specimens of the fine *Molytes germanus* (Kingsdown), and *Harpalus sabulicola*. The following were also obtained:—*Harpalus ruficornis*, *Donacia sericea*, *D. lemnæ*, *D. linearis* (the last three near Sandwich on Iris), *Otiorrhynchus atroapterus* (in the sand), *Cneorrhinus geminatus*, *Crypticus quisquilius*, *Dascillus cervinus*, *Malachius viridis*, *Pyrochroa serraticornis*, and *Leptura livida*. Larvæ of *Hypera variabilis* were abundant on lucerne at Kingsdown, but beetles were not seriously worked.—F. M. B. CARR; 46, Handen Road, Lee, S.E.

RECENT LITERATURE.

Economic.—Mr. W. J. LUCAS has written the first entomological leaflet in the "Nature-Knowledge" series, issued by the Agricultural Education Committee. It deals with the Lace-wing fly (*Chrysopa perla*), and is brightly and simply written; it should prove a valuable inducement to children for the acquisition of "nature-knowledge." ("Lace-wing or Golden-eye." "Nature-Knowledge" Leaflets, no. 9. 3 pp.; 3 figs. [No date.])

Rhynchota.—HERBERT OSBORN notes an interesting case of mimicry presented by the South African Tetigoniid *Cephalelus infumatus*, a species described some seventy years ago. The insect "is a little over half an inch long, of a brown colour, and has a remarkably prolonged head, which anteriorly tapers out into a very long spine. This prolonged head is almost one half the total length of the insect. The body is slender, and the wings terminate posteriorly, somewhat abruptly, but in such a manner that they fit very perfectly upon the stem of the plant which is its ordinary food. The protective feature comes in from the aborted leaf-sheaths on the stem of the plant, forming sharp spines occurring at intervals along the length of the stem, and these are perfectly reproduced in the form and colour of the insect. So close is the resemblance that, when a number of the spines are mounted separately alongside of the insects, it is very difficult to distinguish them without the most careful scrutiny." *Cephalelus* "lives on the rush *Dorea tectorum*, Masters, the spines of which are mimicked." (1902: 'Psyche,' p, 327.)

Neuroptera.—V. L. KELLOGG discusses the phylogeny of the Mallophaga, and calls attention to an earlier paper published by him in 1896 ("New Mallophaga, &c.," in Contrib. to Biol. from Hopkins Seaside Lab., vii.; 117 pp., 14 Plates). From evidence based upon the structure, principally of the mouth-parts and, in a less degree, of the internal organs, the author concludes that the Mallophaga are degenerate Psocidæ, the wingless *Atropos* forming an important link. (1902: 'Psyche,' ix., pp. 339-43, "Are the Mallophaga degenerate Psocids?")

G. W. K.

OBITUARY.

Mr. J. B. WILLIAMSON died at Slough on June 21st last, at the age of seventy-four years. The present writer had known him for over ten years, and esteemed his friendship very highly. He was by profession an artist, and formerly a frequent exhibitor in the Academy, principally in water-colour. He was first led to take up entomology on account of the assistance the wing-colouring of the Lepidoptera gave him in the study of colour and in designing. He formed a very fine collection of British Lepidoptera, but owing to failing health he had been unable for some years to keep in touch with other entomologists, though there are still many readers of the 'Entomologist' who will remember him.—E. S. C.



W. J. Lucas, del.

Meriania argentifera, Meig. ($\times 3$.)

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MERIANIA ARGENTIFERA, MEIG., A TACHINID NEW TO BRITAIN.

BY COLBRAN J. WAINWRIGHT, F.E.S.

(PLATE III.)

AMONGST a few Diptera sent to me for identification by Mr. W. J. Lucas in the early part of this year, I found a specimen of this species, which, so far as I know, is quite new to the British list. Novelties are by no means uncommon in this comparatively little-known family; at the same time, I was interested in recognizing such a well-characterized and handsome species, and, as Mr. Lucas has prepared very excellent drawings of the fly, and of the side view of its head, some account of it may be generally interesting.

The Tachinidæ form a very large group of the *Calyptrate Muscidæ*, nearly allied to the common "blue-bottles," and including the very abundant and familiar Sarcophagidæ, or flesh-flies. Many of the species are parasitic upon other insects, and in consequence some of them have made themselves unpleasantly known to breeders of Lepidoptera, who have found them in their breeding-cages in place of the expected and more desired butterfly or moth.

We have in this country a quite uncertain number of species, probably about three hundred, and possibly many more. Owing to the fact that they are mostly very much alike, and the specific distinctions minute and often indefinite, they have received very little attention, and consequently are little known; and a number of species undoubtedly remain undetected and unidentified. Moreover, those that *are* known are often little understood—their limits indeterminate and their nomenclature in a muddle. New names and new species, therefore, are more nearly the rule than

the exception in this group. *Meriania argentifera*, Meig., is, however, more than usually clearly defined, and is rather a fine insect, as will be judged from Mr. Lucas's drawing.

The genus *Meriania* was founded by Robineau Desvoidy, or rather the name was created by him, in his 'Essai sur les Myodaires,' 1830. Whether his names should ever be adopted at all is a question, and *how* they are ever identified with anything is a wonder to me. He monographed the whole of the big family of *Muscidæ* (*sens. lat.*), and only very occasionally deigned to notice anyone else's work. He renamed everything, genera and species alike; he split up genera and species so that in many cases a genus represented a species, and was of the value of a species only, and the included species were only the various sexes and forms of the one species; and he characterized all so feebly that they seem to me quite unrecognizable, as a rule. However, Brauer and von Bergenstamm, in their 'Vorarbeiten zu einer Monographie der Muscaria Schizometopa (exclusive Anthomyiidae),' the most important work on the Tachinidæ yet published, revive his name *Meriania* for this genus. Brauer and Bergenstamm give *argentifera*, Meig., as the type. Of the three species (all new names) placed by Robineau Desvoidy in his genus, however, *silvatica* and *borealis* are both definitely identified with *puparum*, F., by Macquart in the 'Annales de la Soc. Entom. de France,' 1848, p. 122; and the other one is a Cape species; so that it seems to me that *puparum*, F., should be the typical species, and *argentifera* cannot be, as it was not in the original genus at all.

Rondani, in his 'Dipterologiæ Italicæ Prodrômus,' vol. i., p. 64, and vol. iii., p. 74, creates a genus *Platychira*, quoting *puparum*, F., as the type, and including other species—*radicum*, F., *strenua*, Meig., &c.—which are now recognized as abundantly distinct. This genus was constituted practically in the same manner as the genus afterwards familiar as *Nemoræa*, and as it is cotypical with *Meriania*, R.D., the name must go at once as a useless synonym.

Schiner, Macquart, Verrall (in his first 'List of British Diptera'), and others recognized a big genus, *Nemoræa* (another name of Robineau Desvoidy, is used, however, in a much wider sense than he intended), and merged *puparum* into it. The name by which it is familiarly known, therefore, is *Nemoræa puparum*. This genus contained a number of closely allied common species distinct from *puparum*; and that species, together with its close ally *argentifera*, always formed a section apart, distinguished at once from all the others by their hairy cheeks. Finally, Brauer and Bergenstamm, in the work already referred to, showed how different they were, and removed them not only to another genus, for which the name *Platychira*, Rdi., was first adopted (part i., p. 86), afterwards changed to *Meriania*, R.D. (part iii., p. 112),

but also finally placed them in a distinct section, far away from the true *Nemoreæ* species, calling the section *Platychira*; and Verrall, in his revised 'List of British Diptera,' published 1902, accepts the name *Meriania*, and gives *puparum*, F., as the one British representative. *Platychira*, with its single genus *Meriania*, is well characterized by the facts that the facial angles (*a*) stand well above the mouth edge (*b*), which projects between them; that the cheeks (*c*) are very hairy, as well as the eyes; that the third antennal joint (*d*) is short and broad, and but little longer than the second (*e*); and that the female has its fore tarsi flattened out. The other characters of venation, &c., which are less distinctive, can be gathered from Mr. Lucas's excellent drawings.

N. puparum, F., has been known as British since Walker's time, but, so far as my knowledge goes, seems to be always rare. I have never met with it myself, and only possess one British specimen, a fine large male taken at Holmbury last April by Dr. T. A. Chapman. This particular specimen is fully 6 lines long, and is larger than any of my Continental types. It is a handsome, robust-looking insect; the general colour brown, with the scutellum and the sides of the second and third abdominal segments red, with interrupted white shimmering bands occupying the fore half of the second to the fourth abdominal segments; the head dark greenish brown, with a golden shimmer on the lower parts, and the usual dark line on the frons; the palpi are yellow; the antennæ and legs all black; the whole insect very hairy, with discal and marginal macrochetæ on the abdominal segments, the remaining characters being the same as shown in the drawing of *argentifera*.

N. argentifera, Meig., seems to be a smaller insect. The one male taken by Mr. Lucas is barely $4\frac{1}{2}$ lines long, and looks about half the size of Dr. Chapman's *puparum*. I expect, however, that as a rule the difference is not great, and, of course, in the Tachinidæ, size is of little, if any, value for specific distinctions. The principal difference between *puparum* and *argentifera* is that in the former species the hairs on the cheeks (*c*), and many of those on the chins (*f*) and back of the head (*g*), are pale (Schiner says white, but in mine they are golden, and I expect they are always so in fresh specimens), whilst in *argentifera* they are black throughout. Other differences are, that in *argentifera* the general colour is more blue-black than brown, and the white shimmering bands on the abdominal segments are very faint, and only to be seen plainly at the sides. Schiner says that the forehead in the male of *argentifera* is wider than in *puparum*, taking up "almost one-third of the whole head-width"; it is certainly a little wider in Mr. Lucas's specimen than in *puparum*, but not much, and certainly does not take up one-fifth of the total head-width. Schiner also says that the red on the abdomen is less noticeable

in *argentifera*, but in these two specimens I have before me there is little difference in that respect. The red abdominal markings in the Tachinidæ are, however, always very variable, and of little specific value.

Mr. Lucas obtained his specimen in the New Forest, on April 30th, this year. Both species of *Meriania* appear to be always early spring insects, and possibly for this reason have been overlooked, as few Diptera appear so early in the year, and dipterists are accordingly not often out collecting them. Schiner says that they occur "in the earliest spring, on sunny tree-trunks, and like to sport with one another and with other *Muscidæ*." Brauer records the breeding of *argentifera* from a lepidopteron, *Mesogona oxalina*, Hb.; and *puparum* has been bred from *Panolis piniperda*, Pz.

I have to thank Mr. Lucas for kindly presenting me with the, at present, unique British specimen.

ON THE LARVA OF *LIPHYRA BRASSOLIS*, WESTW.

By DR. T. A. CHAPMAN, F.E.S.

(Concluded from p. 228.)

PERHAPS the most remarkable thing about this remarkable larva is the modification which has affected the prolegs. When we examine the soft under side of the larva, the head, true legs, and prolegs are seen very much as in the young larva; the head, however, is nearly white, and so are the true legs, except the tarsal tips.

Beginning at the margin of the dorsal shield where it sets down on the surface on which the larva may be resting, we find that the shagreened points of the general surface carry hairs of various lengths, some almost evanescent, others nearly .25 mm. long; these no doubt assist in making the opposition of the larva to its resting place more complete. These seem to be true hairs jointed at the base, and the points over the dorsum are probably also really hairs rather than spicules. The shagreened dots are about .08 mm. in diameter. As one passes inwards from the margin, the hairs get rather thicker, and retain their length of .2 to .28 mm., the shagreened bases lose all chitinous colour, and, a short way in, is apparently a smooth surface, thickly studded with white, short, thick hairs; as we approach the prolegs these get shorter and sharper, and fail altogether at a line just below the summit of the column, at top of which is the retractile portion of the leg. Then, just at the margin of the summit of the column, is a compact circle of crotchets, that differ in no very decided manner from those ordinarily found on

prolegs. Within this circle is a white projecting mass of tissue, with a ridge along its summit from front to back, with parallel striæ running down to the margin. The crotchets are hooked outwards, have a short flat base applied to the surface of attachment, and, without forming two or three regular rows, are in more than one row. The little smooth space outside them gives them room for movement without being interfered with by the hairs that clothe the rest of this under surface.

These circles of crotchets, which are to all appearance identical with the complete circles found on the prolegs of "Micro" larvæ, are not the ordinary crotchets at all, but an entirely new structure. The true crotchets exist in the young larva, but in this full-grown one are merely represented by the striæ on the central fleshy mass noticed, which is really the true proleg; the crotchets here existing are round the summit of the pillar, at the centre of which the true proleg is here, as often, placed. Its method of working must be very similar to that of the "Micro" full circle, but, instead of having a central tendon as they have, it has the whole proleg structure, by the movement of which it must be expanded and contracted so as to take and relax its hold.

The true legs are rather small and rather thick, and densely or at least very closely and regularly clothed with fine white hairs, and terminate in a claw; slightly hooked, slender as compared with the last joint of the leg, dark in colour, making it look very strong and sharp, and capable of being flexed, so as to fold up on to the last (tarsal) joint of the proleg, reminding one of the tibiæ of *Nepa* or *Mantis*.

The head is nearly colourless, about 1.7 mm. wide; centrally below the mouth, and pointing backwards, is the labium or part of it, a pale conical rather than cylindrical process ending in a short chitinous tube (spinneret?). On each side is a long palpus (maxillary?) of three joints, the last very small, projecting ventrally, and apparently with a fleshy process (maxilla?) towards the middle line; in front is a tolerably normal labrum, square and notched below, with a good many short hairs on its anterior surface. The antennæ are very long, about 1.1 mm., and regularly clothed with fine hairs; I cannot recognize a basal joint, if there is one; the next, therefore however, first, is very long, 1 mm., and also thick about .22 mm.; the last joint is a small square piece about .1 mm.

The labrum is very fixed in its position and moves little; even if I am deceived in this matter by having only stiff preserved specimens to deal with, it is certain that it fits down very closely and tightly laterally in the maxillary bases, leaving in front an oval opening between it and the labium, within which the jaws are visible, with apparently some room for movement in the cavity thus formed.

Each jaw carries three teeth, not mere notches as in Lepidoptera generally, but each tooth is a long sharp spine, capable of piercing, but certainly not of biting; each jaw is probably capable of meeting the other, so that the teeth may interlock, but in the specimens examined one jaw is entirely in front of the other.

The eye-spots are six, five of them in a semicircle, the other separate.

The head, which looks sunk into the white fleshy tissue of the under side of the larva, is really very moveable, and has a definite neck (?), so that the mouth-parts, which are at front of head and point more or less forwards, can be directed directly backwards, between the true legs, exposing the front or dorsum of the head, which is rather longer than broad, nearly colourless, and has some hairs, and the usual suture marking off the clypeus.

I should like, by again mentioning, to emphasize what seems to me as remarkable a feature as any it possesses—*viz.* the development, *de novo*, of a "Micro" proleg, by the obsolescence of the real crotchets, though not of the base that carries them, and by the appearance of an entirely new set of crotchets round the base of the proleg proper.

Not so remarkable as a structural modification, but more so, perhaps, as connected with most unusual habits, is the modification of the jaws, as piercing and tearing and no longer biting organs, and, if I observe correctly, the alteration of the trophi into a suctorial tube, from which the jaws are just able to protrude; remarkably similar, functionally, to the tube surrounding the jaws in *Phyllocnistis*, though the details of structure and habits are so widely different.

The jaws would most effectively take a hold of the skin of an ant larva, piercing its skin at the same time in six places; they would then draw the piece so seized within the closed cavity formed between labrum, labium, and (laterally) maxillæ, so that the juices of the larva could be easily sucked out.

There is also a larva of intermediate size, which differs from the larger one in nothing except perhaps that the spiracles are more readily seen than in the full-grown one.

The pupa I have before me is very large, 28 mm. long, 14 mm. broad, and 10 mm. deep, whilst it is depressed in front, in a way apparently due to pressure; were the rounded contour of the dorsum and sides continued its depth would be 12 mm. It is typically Lycænid in form, being very round at either end, broadest at fourth and fifth abdominal segments, narrower thoracically; head beneath; no moveable segments; no trace of cremastral hooks or of any silken girth; first leg equally against head and antennæ. The maxillæ are well developed; they appear to contain no maxilla (the specimen being close on emergence),

but the labial palpi are very evident beneath them. The most special feature of the pupa is a set of flanges, or raised ribs. If the pupa were divided into a dorsal and ventral piece, by a section through its widest dimensions, the line of section would mark one of these ribs, which starts round the abdominal segments from the anal angle of the wings (end of vein 1c), and goes round the end of the pupa, dividing the last segment into two portions; this segment is consequently of considerable antero-posterior dimensions, stretching a good way under the pupa, but also having a portion, as it were, lifted right out on to the dorsum by having to be above the flange. The segmental incisions are all raised into double ridges, but ventrally, *i. e.* below the marginal flange above noted, but with no trace of anything of the sort above it, each segment has another single ridge or flange about one-third of the way in front of each incision. The scars of prolegs are well-marked by large areas into which these ribs do not intrude.

These flanges are obviously the remains of the great marginal border of the caterpillar, and of the division beneath it of each segment into two. The marginal ridge extends forwards through the wings, but the pupal shell is so delicate that it is difficult to say whether this ridge is in the wing-covers, or an indication of a flange on the segments beneath them, showing through.

The spiracles are more obvious than in the larva, and occupy a similarly dorsal position. The pupa is very smooth and polished at least thoracically; the abdomen has very numerous, almost microscopic hair-points.

I have also a specimen of the pupa within the larva skin. This fully illustrates Mr. Dodd's account of how pupation occurs. The larva skin becomes a little altered by the dorsum being rather raised and rounded, but substantially it is the adult larva one sees, and this forms a case or cocoon, precisely as happens in the pupation of the Muscidæ.

The pupa inside lies quite free from any attachment to the skin, but the ventral depression of the pupa is due to its having to fit on the ventral aspect of the larval skin, which is raised centrally by the head, legs, prolegs, &c.

The larval skin dehisces by cracking round the marginal crest in front, by a crack across the front of the three ridges, *i. e.* between third and fourth abdominal segments. The semi-circular portion thus marked off again divides longitudinally into two portions; in my specimen one of these portions is missing, the other loose.

[A plate illustrating the early stages of *Liphyra brassolis* is being prepared, and will be published in the present volume.—ED.]

DESCRIPTION OF A NEW SPECIES OF CICADIDÆ FROM CEYLON.

BY W. L. DISTANT.

♂ COSMOPSALTRIA GAMAMEDA, sp. n.

♂. Head and pronotum greenish ochraceous—possibly pale green in fresh specimens; head, front with black carinæ on each side, leaving a pale spot at base and a smaller spot at apex, vertex with the area of the ocelli connected obliquely with a lateral streak, black, eyes piceous; pronotum with two central discal lines connected at anterior margin, two contiguous converging spots near centre of posterior margin, the margins and incisures black; mesonotum with a central discal line, on each side of which is a broader curved lineate fascia, followed by two small spots on anterior margin, a lineate fascia on each lateral area, and a small spot near each anterior angle of the cruciform elevation, black; abdomen brownish ochraceous, the lateral and basal areas paler ochraceous, with a small central black spot on basal segment; sternum, rostrum, and legs pale ochraceous, abdomen beneath brownish ochraceous; basal margin of face, excluding central spot, striated with black, and a black fascia between face and eyes; apices of femora and tibiæ more or less piceous. Tegmina and wings hyaline, the venation ochraceous, here and there tinged with fuscous. Body robust, oblong, slightly greyish tomentose; face not prominently gibbous, obliquely transverse and moderately striate; rostrum reaching apex of posterior coxæ, its apex piceous; opercula short, subtriangular, a little sinuate outwardly, obliquely straight inwardly, apices subacutely rounded and reaching the third abdominal segment.

♀. Abdomen above reddish ochraceous.

Long. excl. tegm. ♂ 39, ♀ 31 millim.; exp. tegm. ♂ 110, ♀ 105 millim.

Hab. Ceylon; Pundalu-oya (E. E. Green).

Allied in markings above to *C. vibrans*, Walk., but a larger species, with a broader head and the opercula altogether different.

Synonymical Note.

Mr. Matsumura, who has studied Dr. Horvath's types at Budapest, and who recently passed through London on his return to Japan, informed me that *Leptopsaltria japonica*, Horv. = *Pomponia japonensis*, Dist.; both descriptions published in 1892. He wished to know the date of publications, and I have looked into the question.

Pomponia japonensis.

Pomponia japonensis, Dist., Mon. Orient. Cicad. p. 102

♂ (Part V. pp. 97–120, May, 1892).

♂ *Leptopsaltria japonica*, Horv. Termész. Füzetek, xv. p. 136 (October 31st, 1892).

A CONTRIBUTION TO THE CLASSIFICATION OF THE COCCIDÆ.

By T. D. A. COCKERELL.

(Concluded from p. 233.)

Walkeriana, Signoret.

Walkeriana, Signoret, Ann. Soc. Ent. France, 1875, p. 390. Type, *floriger*.

♀. More or less covered with dense waxy lamellæ; antennæ 10-jointed.

Species.—*W. floriger*, Walker, *W. compacta*, Green, *W. euphorbiæ*, Green, *W. polei*, Green, and *W. senex*, Green, Ceylon.

W. pertinax, Newstead, and *W. andreæ*, Green, Central Africa.

Section *Aspidoproctus*, Newstead, P.Z.S., 1900, p. 948. Female. Genital opening covered by a flap; waxy processes small, not covering body. *W. pertinax*.

Icerya, Signoret.

Icerya, Signoret, Ann. Soc. Ent. France, 1875, p. 351. Type, *seychellarum*.

Proticerya, Cockerell, Psyche Suppt., 1895, p. 15. Type, *rileyi*.

Crossotosoma, Douglas, Ent. Mo. Mag. March, 1890, p. 79. Type, *egyptiaca*.

♀. Soft, with a long (usually ribbed) posterior ovisac; antennæ typically 11-jointed.

♂. Without caudal processes.

Species.—*I. seychellarum*, Westw., islands of Indian Ocean; *I. natalensis*, Douglas, Natal; *I. albolutea*, Ckll., W. Africa; *I. formicarum*, Newstead, India; *I. egyptiaca*, Douglas, Egypt, Ceylon; *I. tangalla*, Green, Ceylon; *I. crocea*, Green, Ceylon; *I. pilosa*, Green, Ceylon; *I. purchasi*, Maskell, Australia, &c.; *I. koebelei*, Maskell, Australia.

I. brasiliensis, Hempel, Brazil; *I. schrottkyi*, Hempel, Brazil; *I. montserratensis*, Riley-Howard, West Indies; *I. palmeri*, Riley-Howard, Mexico; *I. rileyi*, Ckll., New Mexico; *I. littoralis*, Ckll., Mexico.

Section *Proticerya*, Ckll. Female antennæ 9- to 10-jointed. *I. rileyi*, *I. littoralis*.

MARGARODINÆ.

Margarodes, Guilding.

Margarodes, Guilding, Trans. Linn. Soc. Lond. xvi. (1829), p. 115; Giard, C. R. Soc. Biol. Feb. 10th, 1894, p. 412. Type, *formicarum*.

Porphyrophora, Brandt, Mem. Ac. St. Petersb. 1834, 1835.

Sphæraspis, Giard, C. R. Soc. Biol. Nov. 10th, 1894, p. 712. Type, *vitium*.

Subterranean, anterior legs of both sexes adapted for digging.

♀. Adult soft, mouth absent, legs and antennæ present; intermediate stage hard, globular, more or less like a pearl, with no legs.

Species.—*M. gallicus*, Signoret, France; *M. hameli*, Brandt, Armenia; *M. perrisi*, Signoret, France; *M. polonicus*, Linné, Poland.

M. trimeni, Giard, S. Africa; *M. capensis*, Giard, S. Africa.

M. formicarum, Guilding, West Indies; *M. rileyi*, Giard, West Indies; *M. hiemalis*, Ckll., New Mexico; *M. vitium*, Giard, Chile.

Section *Sphæraspis*, Giard. Intermediate stage ovoid, without any appearance of segmentation. *M. vitium*, *M. capensis*.

Section *Porphyrophora*, Brandt. Anterior legs less swollen; antennæ with 7 to 9 joints. *M. hameli*, *M. polonicus*, *M. gallicus*, *M. perrisi*.

Cælostomidia, Cockerell.

Cælostomidia, Cockerell, 'Nature,' Feb. 15th, 1900, p. 367. Type, *zealandicum*.

Cælostoma, Maskell, Trans. New Zealand Inst. xii. (1879), p. 294. Type, *zealandicum* (not *Cælostoma*, Brullé, 1835).

♀. Soft, with legs and antennæ, but no mouth. Anterior legs in both sexes normal.

♂. With no caudal brush.

Species.—*C. assimilis*, Maskell, *C. wairoensis*, Maskell, *C. zealandica*, Maskell, *C. compressa*, Maskell, and *C. pilosa*, Maskell, New Zealand.

Subgenus *Ultracælostoma*, Ckll. Female. Adult without mouth or legs; antennæ with about five joints, more or less rudimentary. *C. assimilis*.

Callipappus, Guérin.

Callipappus, Guérin-Ménéville, Rev. Zool. 1849, p. 129; Fuller, Trans. Ent. Soc. Lond. 1899, p. 435. Type, *westwoodi*.

♀. Body more or less triangular, thin in front; abdomen with only the first two or three segments visible, the rest forming a pouch which contains the eggs. Antennæ 10- or 11-jointed. Mouth absent.

♂. With a caudal brush.

Species.—*C. westwoodi*, Guérin; *C. australis*, Maskell; *C. immanis*, Maskell; *C. rubiginosus*, Maskell; *C. farinosus*, Fuller; *C. bufo*, Fuller: all from Australia.

Sasakia, Kuwana.

Sasakia, Kuwana, Proc. Calif. Acad. Sci. 1902 (not yet published).

♀. "Enclosed in cottony secretion; antennæ 9-segmented; body

distinctly segmented; no digitules on claw nor on tarsus; mouth wanting in adult; anal tube absent." (Kuwana.)

Species.—*S. quercus*, Kuwana, Japan.

Xylococcus, Loew.

Xylococcus, Loew, Verhandl. d. k. k. Zool.-Bot. Ges. xxxii. (1882), p. 271; Pergande, Bull. 18, n. s., Div. Ent. Dep. Agric. (1898), p. 18. Type, *filiferus*.

♀. Antennæ 9-jointed; legs well-developed; mouth absent; digitules present, but without knobs. In all stages between larva and adult the mouth is present, and the legs and antennæ are absent.

♂. With an abdominal brush. Arboreal insects, living on *Tilia*, *Betula*, and *Quercus*.

Species.—*X. filiferus*, Loew, Central Europe; *X. betulæ*, Pergande, North America; *X. quercus*, Ehrhorn, California.

ORTHEZIINÆ.

Orthezia, Bosc.

Orthezia, Bosc, Journ. de Phys. xxiv. (1784), p. 171; Lounsbury, 32nd Ann. Rep. Mass. Agr. College. Type, *characias* (= *urticæ*).

Cyphoma, Gistel, Nat. des Thier. (1848), p. 151. Type, *characias* (not *Cyphoma*, Bolt. 1798).

♀. Body compact, short, more or less covered with waxy white lamellæ; a more or less elongated ovisac of firm texture; legs long and well-developed; antennæ 8- (rarely 7- or 9-) jointed; mouth well-developed.

♂. Eyes compound; abdomen with a caudal brush.

Species.—*O. cataphracta*, Shaw, Northern Europe, Siberia, Greenland; *O. urticæ*, Linné, Europe; *O. delavauxi*, Thieb., Europe; *O. floccosa*, De Geer, Europe; *O. mænariensis*, Douglas, Italy.

O. occidentalis, Douglas, Colorado, New Mexico; *O. annæ*, Ckll., New Mexico, &c.; *O. nigrocincta*, Ckll., New Mexico; *O. sonorensis*, Ckll., Mexico; *O. artemisiæ*, Ckll., New Mexico; *O. garryæ*, Ckll., New Mexico; *O. monticola*, Ckll., New Mexico; *O. cheilanthei*, Tinsley, New Mexico; *O. graminis*, Tinsley, New Mexico; *O. lasiorum*, Ckll., New Mexico.

O. insignis, Douglas, Tropics of the New World, Ceylon; *O. prælonga*, Douglas, Tropics of the New World; *O. ultima*, Ckll., Argentine Republic.

Section *Arctorthezia*, Ckll. Waxy secretion dense, not easily removed; wedge-shaped lamellæ in dorsal line. Boreal types. *O. occidentalis* (type of section), *O. cataphracta*.

Ortheziola, Sule.

Ortheziola, Sule, SB. Bohmisch. Ges. 1894, p. 5.

♀. Similar to *Orthezia*, but antennæ 4-jointed.

Species.—*O. vej dovskyi*, Sule, *O. signoreti*, Haller, Europe; *O. fodiens*, Giard, Guadeloupe.

PHENACOLEACHIIDÆ.

Phenacoleachia, Cockerell.

Phenacoleachia, Cockerell, Canad. Entom. 1899, p. 274.

♀. Form elongated, labium long; anal ring with six hairs; antennæ 11-jointed, with curved spines at the end.

♂. With two long caudal filaments; and compound eyes consisting of ocelliform bodies forming a single ring round the head, interrupted above and below.

General form of both sexes resembling the Dactylopiini.

Species.—*P. zealandica*, Maskell, New Zealand.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE AUCHENORRHYNCHOUS HOMOPTERA.

BY DR. H. J. HANSEN. C

(Continued from p. 236.)

IV.

As above mentioned, I accept the classification of the Auchenorrhynchous Homoptera into four families (proposed by STAL in 'HEMIPTERA AFRICANA,' vol. iv.), with the limitations for these given by him. At the same time, STAL's fundamentals of this system are very defective, so that not one of the later authors, not once even J. SAHLBERG, has adopted them. I now attempt to collect the chief points of the new results of my researches, with the earlier known facts for an analytical table of the family characters.

The exclusive characters are printed in italics, the not absolutely exclusive but well characterized structures are printed in ordinary type.

When one has to deal with several types (here families) the nature of the analytical table sometimes causes a difficulty, *i. e.* the strong emphasizing of a character absolutely peculiar to one family (for instance, the absence of an empodium in the *Stridulantia* in contradistinction to its presence in all the other families); I have endeavoured to obtain this by the employment of special printing; square brackets are used for sentences inserted, and are not used when a special point is to be brought into relief.

A. *Second segment of peduncle of the antennæ without sensory organs, flagellum with several or many sensory foveæ. Intermediate coxæ with the intero-basal angles a little remote inter se; coxal ab-*

duction somewhat small. *Metasternum* either entirely chitinous, or with two medium-sized membranous areas. Posterior *coxæ* mobile, trochantins apparent; posterior trochanters a little or not wider than the femora; a flexion only possible between trochanter and femur; posterior femora without a "yellow spot" on the upper surface. Pleura of third to eighth abdominal segments entirely located on the lower side, formed of a larger exterior chitinous plate, and of an interior narrower area, partly membranous or evanescent.* First pair of abdominal spiracles placed either laterally or ventrally. Third to eighth pairs placed ventrally, looking downwards. Tegulæ always absent.

a. Three ocelli.

Flagellum consisting of five (or four?) elongate segments; sensory foveæ very numerous in the two basal segments of the flagellum (some even found in the other segments). Conspicuous part of the mesonotum very large. Anterior femora very different from the intermediate pair [always considerably incrassate]. No empodium. Second pair of abdominal spiracles placed in a transverse ventral furrow, looking anteriorly and medianly; third to seventh pairs placed in the sternites, not in the pleura. Stridular organ present in the male. Antennæ always placed in deep pits in front of the eyes under the anterior margin of the vertex. Tegmina unarmed beneath. Anterior margin of the wings a little curved towards the base, unarmed. *Metasternum* entirely chitinous. Posterior scarcely wider than the intermediate *coxæ*, never reaching to the lateral margin of the thorax. Posterior femora simple, posterior tibiæ cylindrical.

1. Stridulantia.

b. Ocelli two or none. Flagellum composed of either numerous segments, or of an inflated basal segment and a very slender "seta"; some sensory foveæ present, never numerous. Conspicuous part of the mesonotum medium-sized, or small or absent. Anterior femora scarcely different from the second pair [most often not incrassate].† A large empodium present. Second pair of abdominal spiracles placed laterally, looking exteriorly or partly upwards. Third to eighth pairs placed in the pleura. No stridular organ.

a. Flagellum composed of a large subpyriform basal segment, and a very slender "seta"—generally subarticulate; basal segment with some sensory organs, "seta" without them. Tegmina with a carina towards the base on the lower surface. Anterior margin of wings towards the base with a triangular plate, which is furnished on the exterior margin with some hooks. *Metasternum* somewhat long, with two medium-sized membranous areas, Posterior *coxæ* scarcely wider than the intermediate pair, not reaching to the lateral margin of the thorax.

* In *Cystosoma* entirely coalesced with the tergites and sternites.

† In *Darnis*, Fabr., the anterior and intermediate femora are strongly incrassate.

Posterior femora towards the base on the upper surface with a wider transverse keel. *Empodium* thicker, beneath with two chitinous spinose strips, the free margin a little or scarcely emarginate. Eyes always placed on the vertex towards the base. Antennæ always placed in deeper pits in front of the eyes under the anterior margin of the vertex. Intermediate coxæ with a strong meracanthus. Posterior tibiæ cylindrical, each with a single process, or with two conical larger processes on the outer surface. — 2. **Cercopidæ.**

β. *Flagellum* always composed of numerous segments; basal part longer, formed either of some (2-6) segments, or transversely furcate, furnished with some scattered sensory pits; distal part divided into many segments, at least in part. *Tegmina* beneath not carinate. Anterior margin of the wings without a triangular plate, sometimes somewhat convex. *Metasternum* short, entirely chitinous. Posterior coxæ much wider than the intermediate pair, extending as far as to the lateral margin of the thorax. Posterior femora simple at the base. *Empodium* thinner beneath, without apparent chitinous spines; free margin profoundly incised medianly. Ocelli sometimes on the vertex, sometimes on the front, occasionally evanescent. Antennæ usually inserted in front of the eyes, sometimes under the eyes. Intermediate coxæ somewhat rarely with a meracanthus. Posterior tibiæ very often prismatic or foliaceous, very rarely almost cylindrical, generally seriately spinulose, very rarely unarmed. — 3. **Jassidæ.**

B. Second segment of the peduncle with many or very many peculiar (composite) sensory organs; flagellum with a single larger sensory organ on the pyriform basal segment. Intermediate coxæ with the intero-basal angles considerably or very distant inter se; coxal abduction well developed. *Metasternum* almost entirely membranous, and this thin cuticle is extended outwards to the lateral parts of the metathorax, which is inflected somewhat on the lower side of the body. Posterior coxæ immobile, their exterior part coalesced with the metathorax; trochantins absent. Trochanters very much stouter than the posterior femora; both an adduction and a flexion possible between trochanter and femur. Posterior femora with a "yellow spot" near the base on the upper surface. Pleura of the third to eighth segments largely or altogether situated laterally, either altogether membranous, or with a large upper area in large part or altogether membranous, and a lower plate chitinous. First pair of abdominal spiracles situated dorsally within the exterior produced part of the metanotum. Third to eighth pairs situated essentially laterally, and in large part or altogether turning outwards.

Ocelli more rarely evanescent, more often two at the sides of the head in front of the antennæ; sometimes a third ocellus is found on the lower margin of the front near the base of the clypeus. Antennæ inserted under the eyes; flagellum composed

of a thicker basal segment, and a very slender "seta," either exarticulate, or partly or altogether divided into numerous segments. Tegula almost always present. Empodium coalesced with the claws throughout a shorter distance, and at most through two-thirds of the length of the claws; free margin a little emarginate or simple. Second pair of abdominal spiracles dorsal, somewhat remote from the lateral margin.

4. Fulgoridæ. 0

(To be continued.)

ON SOME NEW GENERA AND SPECIES OF HYMENOPTERA (ICHNEUMONIDÆ, CHRYSIDIDÆ, FOSSORES, AND APIDÆ).

By P. CAMERON.

(Continued from p. 241.)

SPHEGIDÆ.

AMPULEX LONGICOLLIS, sp. nov.

Cærulea, antennis pedibusque nigris, femoribus posticis dimidio basali rufo; alis fusco-violaceis. ♀. Long. 16-18 mm.

Hab. Khasia (coll. Rothney).

Antennæ black, sparsely covered with black hairs; the third joint twice the length of the fourth. Head dark purple, the cheeks and oral regions of a brighter tint; the front and vertex coarsely rugosely punctured; the former with a keel down the apical two-thirds. Clypeus aciculated, stoutly keeled down the middle, and sparsely haired; the apex rounded; the sides armed with an oblique longish tooth. Mandibles black, keeled down the middle and at the sides. The front and vertex are sparsely haired. Thorax blue, mixed with purple and green; the median segment for the greater part indigo-blue. Prothorax smooth, aciculated, and with a few scattered punctures; its base distinctly separated, and the apex is depressed; the apical part narrowed towards the apex and transverse at the base; the prothorax is if anything longer than the mesothorax, which bears large deep scattered punctures, as do also the scutellum and post-scutellum; these are sparsely covered with long black hair. The central keel on the median segment is straight, and reaches shortly beyond the middle; the second keel is of similar length; the outer longer, reaching to the apex; the segment is stoutly transversely striated, the striæ becoming more curved and irregular at the apex of the keels; the middle part at the apex is smooth; the apex of the segment is perpendicular, and ends at the sides above in stout teeth. Mesopleuræ coarsely irregularly punctured; the metapleuræ with a longitudinal keel below the keel which ends in the tooth; the space between the two bearing, near the middle and apex, some straight keels; the base below is aciculated, the rest reticulated. Mesonotum bearing large deep round punctures; its base smooth; the middle furrow deep.

Legs blue; the tarsi black; the apex of the hinder femora and the tibiæ black; the basal half of the hinder femora red. Wings fuscous-violaceous, more hyaline in the discoidal cellules. Abdomen blue, shining; the basal half of the petiole very narrow; the apical half abruptly dilated, and distinctly narrower than and separated from the second segment, which is constricted at the base.

AMPULEX TRIGONA, sp. nov.

Cærulea; antennis tarsisque nigris, femoribus posterioribus rufis; alis fusco-violaceis, nervis fuscis. ♀. Long. 21 mm.

Hab. Khasia (coll. Rothney).

Antennæ stout, shorter than the thorax, black, covered with a pale down; the third joint about one-third longer than the fourth. Head sharply obliquely narrowed behind the eyes; the vertex has a wide shallow furrow in the middle behind, and is sparsely punctured laterally; the front has some elongate foveæ or punctures on the sides; in the centre over the antennæ are some semicircular keels, and one also encloses the front ocellus. The antennal keels are stout, slightly curved, and narrowed at the top; in the middle immediately above them is a distinct black tubercle. The clypeus is sharply keeled throughout in the centre; the apex in the middle roundly and broadly projects, and has on either side a small rounded tooth. The eyes distinctly converge above, and are there separated by about the length of the third antennal joint. Pronotum slightly longer than broad, of almost equal width; in the basal half above is, in the middle, a distinct keel, the space on either side of which is slightly depressed. Mesonotum smooth, the furrows deep; the space between them darker, of a more violaceous hue than the sides. The median segment is transversely striated throughout; the striæ enclosed by the inner keels being more widely separated; and those on the extreme outside are stouter and still more widely separated. All the keels reach to the apex, being united there to a stout semicircular keel; its posterior keel is broadly depressed in the centre. The lower two-thirds of the apex of the segment is closely transversely striated; the upper part has a keel down the middle, and three or four irregular keels on the sides. The spine on the top is stout, narrowed and transverse above; below it is a smaller triangular one. The upper half of the propleuræ is raised, and distinctly separated from the lower; below the middle, on the apical half, are a few stout keels; the upper half of the mesopleuræ bears large deep irregular punctures; the apex of the metapleuræ is striated. Mesosternum with a few scattered punctures; the central furrow moderately wide, and with transverse keels. The anterior trochanters, femora, and tibiæ are reddish in front; the four posterior trochanters and femora are bright red; the hinder claws are stout at the base, and have a stout subapical tooth. The alar nervures are fuscous. Abdomen smooth, the middle purple; the petiole with the narrowed basal part short; the basal part beneath is stoutly transversely striated. The head is more sharply narrowed behind than usual, and the legs have more red.

(To be continued.)

NOTES AND OBSERVATIONS.

FOOD-PLANTS OF THE LARVA OF *CNEPHASIA SINUANA*, Steph. — Mr. Banks's remarks on the food-plants of this species had escaped my eye until the other day, when I was looking over the July number of the 'Entomologist.' He there (p. 194) states that Mr. G. Elisha bred it from spun-up flowers of *Chrysanthemum leucanthemum*, collected in North Kent. If he will turn to the 'Entomologist' for the year 1879 (vol. xii. p. 61) he will there see that Mr. Elisha says: "I have also bred *S. pasivana* (*sinuana*) rather freely the last two seasons from larvæ feeding in the flowers of *Chrysanthemum leucanthemum* . . . various parts of Kent and Surrey." Now the question is, Did he breed *sinuana*, Steph., from this plant at all? Of course *pasivana*, or more correctly *pascuana*, Hüb., is, as everyone knows, a very different species, bearing no resemblance whatever to *sinuana*, Steph., and it *does* feed (as well as upon several other plants) upon the flowers of the "dog daisy." I am aware that for some extraordinary reason Dr. Wocke sank *sinuana*, Steph., as a synonym of "*pasivana*," Hüb.; not by any means the only mistake he made. Possibly Mr. Elisha was using Wocke's name, otherwise surely there must have been some mistake somewhere! There is one great difficulty to get over. If the late Mr. Sang saw the specimens which were bred from *C. leucanthemum* and pronounced them to be *sinuana*, Steph., I of course must bow to his decision, as so good an entomologist could never have mixed up two such very distinct species.—A. THURNALL; "Mascotte," Whitehall Road, Thornton Heath, Sept. 12th, 1902.

NOTE ON *EUZOPHERA PINGUIS*.—On Thursday, August 7th, I was passing (about 8 p.m.) a solitary ash tree about ten minutes' walk from here, and upon glancing at the trunk as I passed was rather surprised at counting thirteen specimens of *Euzophera pinguis* upon it; most of them had only just left the pupa, their wings being held butterfly fashion over their backs. I visited this tree for several successive evenings until the 17th, and never failed to find several on each visit. On two occasions the moths were seen to leave the pupa. After an interval of nearly a fortnight I revisited the tree, and *E. pinguis* was still coming out, but in much smaller numbers, and last evening (31st) I saw one just emerging. In all I boxed forty, and saw quite fifty more out of reach, as they come out late in the afternoon, and very soon run up the trunk, generally well out of reach. How long they had been appearing before the 7th of course I am unable to say, but during the month I think I may say, without much exaggeration, that hundreds must have emerged from this one unfortunate ash!—A. THURNALL; Whitehall Road, Thornton Heath, Sept. 1st, 1902.

ABERRATION OF *VANESSA URTICÆ*.—Miss G. Jeddere-Fisher caught a specimen of *V. urticae* at East Grinstead, Sussex, on August 28th, 1901. This example is entirely without the two spots on the disc of the wing, and is similar in form to that mentioned in Newman's 'British Butterflies' as the variety *ichnusa* of Bonelli.

ABERRATIONS OF *ZYGÆNA MINOS*.—On June 18th I visited the Welsh locality for the above-named species, and found it in great numbers.

The imagines were just emerging and drying their wings, hanging on to the heather and short herbage. Amongst them was one without any trace of crimson, both upper and lower wings being entirely bronzy black; another specimen had the crimson very much reduced and darkened, whilst three others were decidedly darker than is the usual form.—C. F. JOHNSON; Brinnington Crescent, Stockport.

RAPHIDIA LARVA ATTACKED BY A FUNGUS.—At the Oxshott Field Meeting of the South London Entomological and Natural History Society on Sept. 6th one or two larvæ of *Raphidia*, a neuropterous insect, were found on tree-trunks with abdomen very much distended and pale in colour where the integument was soft enough to distend. On the surface of the glass-tube in which one was placed I afterwards found a multitude of spores, and some of them were evidently germinating. On enquiry at Kew Gardens it was found that the larvæ were attacked by *Empusa lampyridarum*. In conversation with other field entomologists I have heard of similar instances. Probably the wet season is in a large measure responsible for this.—W. J. LUCAS.

PROPOSED ENTOMOLOGICAL SOCIETY IN MANCHESTER.—We are making a strong effort here to form an Entomological Society, and would be pleased to hear from any of your readers who are in any way interested in the movement, and who could assist us in our object.—WALTER E. HARDY; 52, Bedford Street, Moss Side, Manchester, Sept. 8th, 1902.

CAPTURES AND FIELD REPORTS.

CYANIRIS (LYCÆNA) ARGIOLUS IN WESTMINSTER.—I have lately discovered that *L. argiolus* has permanently taken up its abode near Westminster Abbey. During the last day or two I have seen one or two specimens flying round some ivy not fifty yards from that building.—L. A. SPENCER; 52, Burghley Road, Highgate, N.W., Aug. 29th, 1902.

COLIAS EDUSA IN SUSSEX.—One cloudy and very windy day about August 10th, I noticed a specimen of *C. edusa* flying along the downs not far from Brighton. This is the only specimen I have so far seen this year on the wing.—A. W. CARDINALL; 18, Cromwell Road, Brighton.

COLIAS EDUSA IN WALES.—On August 26th, whilst staying at Pwllheli, North Wales, I saw a fine male specimen of *C. edusa*. It was flying close to the sea-shore.—(Mrs.) M. ALDERSON; Park House, Worksop.

COLIAS EDUSA NEAR NORWICH.—On August 16th I saw a male *C. edusa* flying by the roadside about two miles from Norwich, but failed to capture it. Two more were seen near this city on Sept. 6th; and a male was captured near my residence on Sept. 9th.—R. LADDIMAN; 25, Drayton Road, Norwich, Sept. 17th, 1902.

POLYOMMATUS ARTAXERXES, Fabr., IN BANFFSHIRE.—On July 8th last my son and I found this rare butterfly in a valley among the cliffs on the Banffshire coast. As the food-plant of the larva (*Helianthemum*

vulgare) was abundant at the spot, I have been for some time in expectation of getting the butterfly, but I failed till this year. There seemed to be only a few individuals in flight, as we did not see more than two at one time during a whole month.—HENRY H. BROWN; Cupar-Fife.

PYRAMEIS (VANESSA) CARDUI, Linn., at 1050 FT. IN BANFFSHIRE.—My son captured a specimen of this butterfly beside the cairn on the summit of the Binn Hill at Cullen, Banffshire, 1050 ft. above sea-level, on July 22nd last. It was faded and rubbed, having probably been carried to that elevation by a high wind, although it is not easy to account for the vagaries of *cardui*.—HENRY H. BROWN; Cupar-Fife.

STAUROPOUS FAGI AT MICKLEHAM.—On July 27th last, after a poor day's collecting, I took a fine female specimen of the above species resting on the trunk of a beech tree about ten feet from the ground. It was quite perfect, and I think had not been out of the pupa more than a day.—E. C. GOULTON; 4, Carnford Grove, Balham.

APAMEA OPHIOGRAMMA AT BALHAM.—On August 26th last I took a worn specimen of this insect at electric light in the town. Although I have kept a good look-out, it is the only one I have seen, and should like to know if any others have been taken here.—E. C. GOULTON; 4, Carnford Grove, Balham. [See report of S. Lond. Ent. and Nat. Hist. Soc., Aug. 28th, published in this number.—Ed.]

DICYCLA OO IN KENT.—I took a fine specimen of this species on a gas-lamp near Chislehurst towards the end of June last.—G. B. BROWNE; 43, Southbrook Road, Lee, S.E., Sept. 17th, 1902.

PRIONUS CORIARIUS IN BERKSHIRE AND IN HERTFORDSHIRE.—On August 26th last Mr. W. H. Warner, of Fyfield, near Abingdon, sent me, for identification, a specimen of this somewhat uncommon beetle, which he had found on the 21st of the month "crushed and lying on a path in a neighbouring wood." I may mention that in 1893 I captured an example of this species as it was flying across a pathway on Batchworth Heath in Hertfordshire.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

BLATTA AUSTRALASIE IN SOUTH DERBYSHIRE.—A cockroach forwarded to me by Mr. Hugo Harpur Crewe from South Derbyshire proved to belong to this species. Enquiries kindly made for me by Mr. Harpur Crewe show that it has been established for the last five years, and that it first made its appearance in a greenhouse where some orchids were unpacked which were received from Queensland in 1895.—FRANCIS C. R. JOURDAIN; Clifton Vicarage, Ashburne, Derbyshire.

ODONATA BRED IN 1902.—From nymphs obtained in Byfleet Canal, and a few from the river at Wye, I bred this year the following species:—Of the Anisopterids, *Æschna grandis* (eight or nine, sexes in about equal proportion), *Libellula quadrimaculata*, *Sympetrum striolatum*; of the Zygopterids, *Ischnura elegans*, *Erythromma najas*, *Enallagma cyathigerum*. The greater number of the Zygopterid nymphs turned out to be *Erythromma najas*; nearly all the Anisopterids were of the family *Æschnidæ*, and all of these of the species *Æschna grandis*. The first *Æ. grandis* imago appeared in the earlier part of

July, the latest in the last week of August—an isolated case long after all the other nymphs had duly accomplished their last transformation. It is a curious thing that every *Æschnid* nymph I have obtained from Byfleet Canal during the last three years has proved to be *Æ. grandis*. Some, it is true, have come to a premature end before emergence, and I could not say certainly that they were *grandis*, but I have very little doubt that they were. Can anyone explain why the nymphs always turn head downwards to devour any prey they may have caught? and why the head of the empty nymph-case after the emergence of the imago is invariably inclined to one side, and (from my observation) usually to the right?—HAROLD HODGE; 9, Highbury Place, London, N.

LESTES DRYAS AT HANWELL, MIDDLESEX.—During July of the present year I was delighted to discover a large colony of *Lestes dryas* at ponds near Hanwell, in Middlesex. The males were abundant, but females were not so common. During last winter the ponds were absolutely dry; so, apparently, the nymphs must have burrowed down into the mud during that season. The species was about from July till the first week in August, but was over by the end of the latter month. Points of distinction from the common *Lestes sponsa* will be found in the bronze spot on the dorsal surface of the first segment of the abdomen, and in the shape of the anal appendages of the male—these in addition to the much bulkier and heavier appearance of the better insect. The distinguishing points are figured in Lucas's 'British Dragonflies,' pp. 230 and 234.—S. W. KEMP; Notting Hill, Sept. 2nd.

THE LARGE EARWIG, LABIDURA RIPARIA, AT POKESDOWN.—Major Robertson has shown me a female of this scarce insect, taken by his daughter, Miss Nellie Robertson, at Bournemouth, on July 17th last. I understand that others have been taken this season. It would be interesting if those who have taken the insect during late years would record their captures, so that its position as a British insect might be better understood.—W. J. LUCAS; Kingston-on-Thames, Sept. 8th.

ERYTHROMMA NAIAS IN BERKS.—Mr. W. Holland took a male of this local dragonfly during the present season at King's Weir on the Upper Thames.—W. J. LUCAS; Sept. 1902.

LESTES DRYAS AT WICKEN.—On August 12th, 1901, Mr. A. H. Hamm took a male of this scarce dragonfly at Wicken Fen. It was undetected at the time of capture amongst the common *Lestes sponsa*.—W. J. LUCAS; Sept. 1902.

EUPITHECIA JASIONEATA IN NORTH WALES.—I have to record *Eupithecia jasioneata* from two localities on the Welsh coast. I found the larva sparingly last August in Carnarvonshire, and also noticed it in some flower-heads of *Jasione montana* sent me by a friend from the neighbourhood of Barmouth.—J. E. R. ALLEN; Enniskillen.

PSAMOTIS PULVERALIS IN SURREY.—I am very pleased to add this species to the list of Lepidoptera occurring in the county of Surrey. I took one example last August in the Ockham district.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

NOTES ON LEPIDOPTERA IN AUGUST.—On August 1st I visited Enfield Lock with the intention of getting a number of larvæ of *Saturnia*

pavonia. Two years ago one could have brought away four or five hundred without difficulty—I am afraid this fact was only too well known to entomologists; now it would be hard to find twenty. Judging from the empty cocoons, *Gastropacha quercifolia* and *Odonestis potatoria* are becoming more numerous in this district. At indoor light at Chingford the following were taken:—*Zeuzera asculi*, *Cerura bifida*, *Pterostoma palpina* (several), *Notodonta dictæa*, *Stilpnotia salicis* (abundant), *Porthesia auriflua*, *Mitochrista miniata*, *Philea irrovella*, *Arctia caia*, *Spilosoma menthastris* (a nuisance), *Gastropacha quercifolia* (one spoilt), a worn-out specimen of *Cymatophora ocularis*, *Hydræcia micacea*, *Axylia putris*, *Xylophasia rurea*, *Xylophasia polyodon*, *Dipterygia pinastri*, *Agrotis puta*, *Mania maura*, and many other common Noctuæ. All these were taken during the first fortnight of August—not a bad product for a London suburb! Sugaring seemed altogether a failure, and there was apparently little worth netting in the Epping Forest district. Some worn-out specimens of *Cossus ligniperda* were brought to me, but this latter moth is one of the commonest in this district. Chisel a little in the willow-trees in June and you may obtain as many pupæ as you wish. The latter, I may mention, are extremely easy to keep. Larvæ of the “kittens” were common enough, but I have seen not a sign of *Cerura vinula* in any state this season. At Dawlish, during the second and third weeks of August, *Callimorpha hera* was abundant. I did not see another collector all the time I was in the district. The weather was charming, and the return of insects was equally so. Pupa-digging is not much patronized in August—why I do not know; I have always found it most productive. I obtained about a dozen *Amphidasys strataria* (it was rather early for the species, however). I could have taken home a large number of *Agriopsis aprilina*, or of the Tæniocampidæ. *Cerastis vaccinii* and *C. ligula* (*spadicea*) were in force. Two pupæ of *Ennomos tiliaria* and one of *Acronycta alni* were found under bark of willow, and one of the *E. tiliaria* has since emerged. A pupa of *Notodonta dromedarius* should be mentioned. Altogether I procured five hundred and ninety-three pupæ, to more than half of which it would be difficult to assign the right names. In August, 1900, I obtained over two hundred pupæ at Lyndhurst, and I scarcely knew the name of one, but there emerged a lot of very good things, well worth the trouble of digging.—STEPHEN GRAHAM; Chingford, Essex.

A FORTNIGHT AT DEAL.—In the course of a fortnight’s holiday at Deal, commencing with August 10th, I found the moths at night-time extremely abundant on the sand-hills. I put up at Martinsfield, between Deal and Sandwich, and had therefore a fine opportunity of night work in this locality. The garden at Martinsfield was surrounded by a privet-hedge in full bloom, and simply swarmed with life by day and night. I found treacling in this garden gave the most remunerative results, the moths coming in large numbers nearly every night to the posts and trees I had selected; at one time I counted over thirty insects on one patch alone, and it was amusing to watch them struggling for the sweets I had provided. The specimens of *Xylophasia polyodon* were particularly pugnacious and a great nuisance, as they doubtless drove away some of the rarer sorts. The following were in abundance and great variety:—*Agrotis obelisca* (by far the most

numerous), *A. valligera*, *A. puta*, *A. exclamatoris*, *Apamea gemina*, *A. oculatea*, *Hydræcia nictitans*, *Triphæna pronuba*, *T. orbona*, *Mamestra brassicae*, *X. polyodon* (fine light and dark varieties), and *Noctua xanthographa*. Among the others less numerous were:—*Miana literosa*, *M. furuncula*, *Noctua c-nigrum*, *N. baia*, *Acronycta rumicis* (three), *Amphipyra tragopogonis*, *Noctua suffusa*, *Agrotis corticea*, *T. interjecta* (two), *T. fimbria*, *Calymnia trapezina*, *Leucania impura*, *L. pallens*, *L. obsoleta* (two), *Phlogophora meticulosa*, *Xylophasia sublustris* (one), *Luperina testacea*, *Cossus ligniperda* (one), *Mania maura*, and *Leucania lithargyria*. In the privet-hedge *Plusia gamma* swarmed, and examples of this species also came to light in such numbers that they were quite a nuisance in the music-room on the lawn. There were also several locusts in the hedge, and one came to the treacle. Thinking that the season for *Callimorpha dominula* was over, I did not work especially for this species, but I was fortunate enough to capture one in the garden during the day in fair condition. I also took by day *Acidalia emutaria* (one), *Zygæna filipendulae* (very numerous), *T. interjecta* (one); and at dusk, *Porthesia auriflua*, and one *Eremobia ochroleuca* in fine condition. Among the butterflies here were—*Pyrameis cardui*, *P. atalanta*, *Vanessa urticae*, *V. io*, *V. polychloros*, *Chrysophanus phlaeas*, *Pararge megara*, *Epinephele ianira*, *F. tithonus*, *Cænonympha pamphilus*, *Lycana agestis*, *L. alexis*, *L. argiolus*, *Pieris brassicae*, *P. rapæ*, and *Hesperia linea*, but, as a whole, day-collecting was not propitious; the hours of sunlight were few and far between, and when the sun was shining the wind was cool and rather high, and suggestive always of rain blowing up. In fact, the only ideal day was the one on which I came away, and I was then too busy packing up to be able to take advantage of it. In the few opportunities I had of exploring the country round about on my bicycle, I saw several *Colias edusa*, and captured seven, five in fine condition, but *C. hyale* was not apparently about. I also took four more *Eremobia ochroleuca* on some thistle-heads in a lane near Sandwich. *P. cardui* were also very abundant in the same spot, and indeed all about that neighbourhood, and I captured as many perfect insects as I wanted. I found *Melanargia galatea* plentiful near Folkestone, and also took one *Aspilates gilvæaria* there. I went down and returned from Deal on my bicycle by way of Dover, Folkestone, Hythe, and Ashford, but had little opportunity of doing any collecting on the road, as the weather during the two journeys was most unfavourable. I slept at Dymchurch, near Hythe, on the outward journey, and did a little dusking there, with the result of capturing *Cleora lichenaria* (three), *Lithosia molybdeola* (two), and *C. phragmitidis* (one). *Abraxas grossulariata* were flying about here in the bushes in large numbers. It will be observed that nearly all my insects were taken in the garden at Martinsfield, and, considering the poor success I had had at sugar all the season up to this fortnight (I treacled in the New Forest for seven nights in early July, with the result of two insects), the few days I spent at Deal were quite a revelation to me. Too many insects at a time (especially to a novice) have certain drawbacks, and I have little doubt that my list of captures could have been largely extended had I not been only a comparative beginner, as I must have passed over many varieties that a more experienced eye would have readily detected.—G. B. BROWNE; 43, Southbrook Road, Lee, S.E., Sept. 17th, 1902.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*July 10th, 1902.*—Mr. F. Noad Clark, President, in the chair.—The President, in a few sympathetic words, referred to the sudden death of Mr. Mark Winkley, an old member, and until recently a regular attendant at both ordinary and field meetings.—Mr. West (Greenwich) exhibited the following Hemiptera taken by Mr. Ashby at Deal during the last week in May and the first week in June:—*Podops inuncta*, *Sciocoris cursitans*, *Rhyparochromus chiragra*, *R. prætectatus*, *Trapezonotus agrestis*, *Macrodera micropterum*, and *Plinthisus brevipennis*.—Mr. Ashby, several species of Coleoptera he had taken on the Deal sand-hills in June, including *Zabrus gibbus*, *Saprinus virscens*, *Melanotus punctolineatus*, *Chrysomela distinguenda*, and *Apion sedi*.—Mr. West, a piece of amber from Maldon, found some forty feet below the surface. There were numerous insects imbedded in it, and, from there being no smell of pine when rubbed, he thought it was not true amber, but gum animi.—Mr. MacLachlan communicated a note on *Cotyledon umbilicus*, pointing out its occurrence at Winchelsea and other places in Kent.—Mr. Step read a short report of the Field Meeting at Ranmore Common on June 7th, 1902, and regretted the unfavourable weather which the nineteen who attended had to endure.

July 24th.—The President in the chair.—Mr. F. M. B. Carr exhibited twelve varieties, and the male parent of *Amphidasys betularia*, bred from ova deposited by a black female, taken in cop. at Lee in 1901.—Mr. Kemp, a series of *Læmostenus complanatus*, a species new to the British list, nearly related to *Pristonychus terricola*, and taken by him near Dublin. He also showed *Carabus clathratus*, *Pelophila borealis*, *Blethisa multipunctata*, *Chlænium nigricornis*, dark *Pterostichus cupreus*, *Bembidium bipunctatum*, *Colambus quinque-lineatus*, *C. novemlineatus*, *Orectochilus villosus*, and *Rhopalomesites tardyi* from Lough Neagh, together with *Bembidium argentiolum*, a recently added species, also from Lough Neagh. From near Dublin he showed *Phytosus balticus*, *Diglossa mersa*, yellow *Cercyon littorale*, *Saprinus maritimus*, *Telephorus darwinianus*, *Cilleus lateralis*, *Polydrusus chrysomela*, *Hydroporus* several species, *Silpha atrata* and var. *subrotundata*, *Hæmonia appendiculata*, *Chrysomela banksii*, *Barynotus schönherri*, *Meloë violaceus*, and a series of the purely Irish *Otiorrhynchus auropunctatus*.—Mr. Kemp, a series of the rare *Lestes dryas* from Hanwell, with *L. sponsa* for comparison.

August 14th.—The President in the chair.—Mr. Edwards exhibited ova of *Anthrocera trifolii* from Byfleet.—Dr. Fremlin said that, during a recent visit to the Isle of Man, he had taken *Dianthæcia cæsia* and larvæ of *Polia xanthomista* var. *nigrocincta*.—Dr. Chapman, specimens of *Neuroptera bipennis* (*lusitanica*) from Bajar, in Spain.

August 28th.—Mr. E. Step, Vice-President, in the chair.—Mr. E. J. Riley, of 94, Drakefield Road, Upper Tooting, was elected a member.—Mr. South exhibited a series of *Apamea ophiogramma*, bred from larvæ taken in his garden at Tooting.—Mr. Turner, a short series of *Agrotis ripæ*, bred at the end of June, 1902, from larvæ taken in August, 1901, at Dawlish. The variation was very considerable, from very snowy forms to an exceedingly dark example.—Mr. Bowman, a large number

of species of the genus *Erebia*, including series of *E. zapateri*, from Spain, and *E. christi* from Switzerland. He also showed a series of *Melanargia lachesis*.—Mr. South, ova of *Tortrix piceana* and *Retinia pinicolana* from Oxshott.—Mr. Adkin, several masses of cocoons of a species of *Apanteles*, which had emerged from the larvæ of *Boarmia gemmaria* in his garden. A discussion ensued as to the cause of the curious curved position of the larval remains over the cocoons.—Dr. Chapman, a specimen of *Scolianula (Bohemannia) quadrimaculella* from Reigate.—HY. J. TURNER (*Hon. Rep. Secretary*).

RECENT LITERATURE.

W. F. JOHNSON and J. N. HALBERT. "A List of the Beetles of Ireland." 1902. Proc. Roy. Irish Acad. (3), vi., pp. 535-827, and 1 map.

It was but a few months ago (Entom. 1902, pp. 54-6) that we hailed the termination of Mr. Kane's 'Catalogue of Irish Lepidoptera,' and we have now to welcome a similar summary of our knowledge of the Coleoptera. A number of local records and partial lists have been published since the days of Haliday, the father of Irish entomologists, in 1828, but Johnson and Halbert are the first to present us with a complete list, a large proportion of the records, indeed, having been made by these author's themselves.

In noticing Kane's work, we briefly summed up the views upon the Erse Fauna held by various specialists in geographical distribution, and these remarks naturally apply also very largely to the beetles.*

Some 1630 species are enumerated, a little less than half the total British Coleopterous Fauna; of these some forty are noted as having been probably introduced more or less recently. There are no species certainly peculiar to Erin, though one form (*Silpha atrata* var. *subrotundata*) occurs in the Isle of Man, but not on the Continent, and has been recorded only very doubtfully from England. There are, however, five species of European distribution not yet found in England—viz. *Dyschirius obscurus*, *Stenus argentellus*, *Bembidium argentiolum*, *Xantholinus cribripennis*, and *Otiorrhynchus auropunctatus*, the last three being recorded for the first time as British.

In the Bibliographical List there are cited fifty-five authors who are responsible for nearly 250 papers and isolated records of Irish beetles. This work, accompanied as it is by notes of capture, &c., of the rare and local species, must prove of high value to the working coleopterist. We believe that the authors have also devoted considerable attention to the Rhynchota, and we hope that they will before long produce a similar account of that highly interesting but sadly neglected order.

G. W. K.

* Led astray by a misprint in Scharff's work, we unfortunately overlooked a suggestive paper by G. H. Carpenter, "The Problems of the British Fauna" ('Natural Science,' 1897, xi., pp. 375-86).

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VARIATION OF *LYCÆNA CORYDON* IN NORTH WILTS.

BY THE REV. C. A. SLADEN.

THIS species—the “chalk-hill blue,” as it is commonly called—occurs in profusion on the downs of North Wilts. Here about harvest-time the foot of the downs, where the turf ends and cultivation begins, is red with the flowers of the knapweed (*Centaurea*), or “hardhead,” as it is sometimes locally called; and on the flowers of this plant *L. corydon* swarms in countless numbers, fighting its fellows for standing room, or expanding its wings to the sun.

In this neighbourhood it varies little in size, though I have occasionally caught little dwarfs of less than an inch in wing-expanse, and other fine fellows of over $1\frac{1}{2}$ in.

The male varies little in colour, but the female varies much; and this applies both to the upper and the under side.

Upper side, male type.—Silvery blue, sometimes with black discoidal spot on fore wings:—

1. With broad black hind margin.
2. With narrow black hind margin.
3. With spotted black hind margin.

In this latter the ocellated spots of the under side show through the hind marginal band on the upper side. The extreme form of this variety has a row of white spots along the hind margin, the black border disappearing. Sometimes specimens occur with the ocellated spots on the hind margin of the hind wings tinged with orange, as in the female.

All these variations are mentioned by Mr. South in his notes on the genus *Lycæna* in the ‘Entomologist,’ vols. xx. and xxxiii., var. 3 being figured on Plate I., fig. 9, in the former volume, and the extreme form of it in Plate III., fig. 5, in the latter.

Upper side, female type.—Brown or black-brown, with black discoidal spot on fore wings, sometimes also visible on hind wings, and with more or less distinct hind marginal row of orange ocellated spots on hind wings :—

1. Variegated with white.

(a) Discoidal spots edged with white.

(b) Hind wings with one or sometimes two interrupted rows of white spots or dashes between the hind margin and base of the wing.

2. Variegated with blue.

(a) Hind wings with blue spots or dashes, sometimes wholly blue ; the fore wings also less commonly with spots or dashes of blue, and sometimes with a central splash of blue, the distribution of colour in this latter case resembling that of dark forms of *Lycæna argiolus*. This form, though apparently not uncommon elsewhere, I have not come across here before this year.

(b) All the wings blue as in the male, but of a richer colour, with or without black discoidal spots, the black hind margin varying in width, as in the male, but always with orange ocellated spots along hind margin of hind wings, as in typical female. This is the variety *Syngrapha*, and it is figured in Dr. Lang's 'Butterflies of Europe,' plate xxvi. fig. 7. I found this variety here first in 1870, though it no doubt occurred here before my time ; but I have only lately tried to obtain a series. Last year, when there was favourable weather, while *L. corydon* was on the wing, I caught thirty specimens of this variety ; this year, in unfavourable weather, I only obtained twelve.

One female caught last year is a small specimen with blue fore wings, and hind wings normal, with few blue scales, reversing the ordinary course of variation in this species. One female caught this year has the veins of the hind wings blue, the intervening spaces being normal colour. In the usual form of partial blue variation the veins remain black, while the intervening spaces are blue. Another female caught this year is of a dull black colour, with white-edged discoidal spot on fore and hind wings, and with indistinct greyish dashes from the hind margin to the base of hind wings. The under side of this specimen is creamy white, wanting the basal spots on fore wings, and several of the spots on hind wings, the other spots, though reduced in size, showing up very distinctly against the light background.

Under side, male.—This does not vary much as to the number of spots, though the spots often vary much in size. Occasionally some of the spots are duplicated, occasionally some are confluent. The variety without basal spots on the fore wings is not uncommon, and the discoidal spot on the hind wings often lacks the black centre.

Under side, female.—The spots vary much both in size and number. An extreme specimen has only discoidal spot on the hind wings, the basal spots being absent on the fore wings, and the row of spots inside the hind marginal row being also very small and indistinct. I have many varieties leading up to this. The ground colour of the under side varies from dark brown to pale or yellowish brown, and on the fore wings to almost white, the white form of under side generally coinciding with variation of colouring of the upper side.

Alton Barnes Rectory, Wilts: Sept. 30th, 1902.

THE NORTH STAFFORDSHIRE FORM OF *ZONOSOMA* (*EPHYRA*) *PENDULARIA*.

By F. C. WOODFORDE, B.A., F.E.S.

THE object of this paper is to call attention to a remarkable form of *Zonosoma pendularia*, which appears to be confined to a very small area in North Staffordshire. The typical form of this species has a very pale, nearly white, ground colour, which makes the insect almost indistinguishable when sitting on the white stems of birches. In the variety under consideration the ground colour is a slaty grey, rather closely approaching that of *Z. orbicularia*, while the whole of the centre of the wing is filled up with a rosy pink. This rosy coloured portion has no clearly defined edges, but merges gradually into the ground colour. It is very difficult to describe colouration of this sort where the colours are thus suffused, so as to convey a clear idea of the object under description; and the Editor, to whom I sent some specimens, has kindly promised to include figures of one or two of them in the next coloured plate of varieties published in the 'Entomologist.'

The habit of most of the species of the genus is to sit during the day on leaves, and, although I have often seen *Z. punctaria* sitting on the trunks, yet I have obtained far more by beating the bushes. *Z. porata* and *Z. annulata* (*omicronaria*) seem always to choose a leaf for a resting-place; *Z. pendularia*, on the contrary, as far as my experience goes, seems always to rest on the stems, generally of small birches, but not unfrequently on the trunks of oak-trees. Very few of the birch-stems in this district of North Staffordshire are white, by far the larger proportion being reddish brown, mottled with dark green by lichens. On such a stem the type-form, which is almost invisible on the white birch-trunks of the New Forest, would stand out most conspicuously; whereas the form under consideration is extremely hard to see, even when one is close, and looking at the very spot

where the insect is sitting. Forms approaching the typical occur here, but the palest is greyer than the type, and individuals of the darker forms are more numerous than representatives of the pale one.

It would appear therefore that this aberration from light to dark is a change brought about for protection, the conspicuous pale form having gradually developed into the very inconspicuous dark one.

Mr. Barrett, in his great work, figured a specimen that I sent him for that purpose, with a very similar but darker form of the same aberration from Mr. Webb's collection; but the locality from which this latter specimen came is not given. After numerous inquiries I cannot discover that anyone has ever seen or heard of this peculiar form occurring in any other locality, though my inquiries extended even into Germany.

Such a distinct and remarkable variety seems to deserve a distinctive name, so I propose naming it *Z. pendularia* var. *subroseata*.

Market Drayton : October, 1902.

ON THE BUTTERFLIES COLLECTED IN EQUATORIAL AFRICA BY CAPTAIN CLEMENT SYKES.

BY EMILY MARY SHARPE. .

[My journey into the interior of Africa I commenced early in 1898. Starting from Mombasa in the train, which in those days only took one 120 miles, I soon got to Kebwezi and Nairobi. Both these places were excellent haunts for the entomologist, and I much regret that I did not embark on making a collection of Lepidoptera and Coleoptera until the time came for my return. Alas! I found myself steaming through these places in 1900 in a train, and my opportunity had gone.

I commenced my collection about July, 1899, when I was at a place called Lamogi, in the valley of the Upper Nile, close to Baker's old fort of Fatiko. Though there are woods in those regions, there is little or no forest, and butterflies were rather scarce. The Nymphalidæ were principally represented. In December, 1899, I journeyed to Wadelai, which is a far drier and sandier place, and there the Pieridæ were fairly prolific. More especially did *Teracoli* abound in great numbers and varieties. Near the sandy banks of the Nile I could always catch as many as I wanted. But the Nile District is a disappointing country for the entomologist, who would naturally expect many new species in such little frequented regions. In

March, 1900, I began my return journey to the coast, and commenced then to work more seriously. Had I known earlier in my career how easily butterflies are sent home, and in what good condition they arrive, I should have sent many thousands more than I did. As it was, I waited until I could bring them to the coast personally, fearing to trust the fruits of so much labour to the tender mercies of the various savages through whose hands they would have to pass.

Through Unyoro I collected a fair number, in the swamps, of the *Nymphalidæ* and *Acraeidæ*, and on entering Uganda proper, the wooded dells, fringed with swamps, afforded opportunities for considerably increasing the collection, especially amongst the *Hesperidæ*. During the evening and at night it was my custom to sit with one end of my tent open, and two lights burning. As the moths came towards and around the light, I watched my opportunity, and directly they were stationary I pressed them to death with the handle of a spoon or fork, having no killing-bottle. I found this possible without doing any appreciable damage to the scales of the specimens. I thus got all the *Hesperidæ* and *Noctuidæ* in the collection.

All the wooded shores of the Victoria Nyanza are admirable hunting-fields, and I have seldom seen such a sight as the butterflies on the shore opposite Lubwa, where an arm of the lake forms an exit for the old river Nile. The steep hill overlooking an exquisite view was ablaze with their colours, and I stood for many hours netting as hard as I could.

Passing through Usoga and Kavirondo, I encountered a famine, where dead bodies of natives and animals lay at frequent intervals in the pathway. Over these hideous objects beautiful butterflies hovered, and it seems strange that nature should give such repulsive food to perfect works of her art. Then I came to the great primæval forest of Nandi, and within its depths the species of *Charaxes* seek the many putrefactions which are always to be found amongst trees and damp heat. As they shake and quiver over some filthy morsel they gradually make themselves drunk, and fall easy victims to the collector. Some enthusiasts hang up putrid meat and carcases to attract these foul feeders, but if forest is near this is unnecessary. It is practically the only way to catch all those butterflies that have a strong flight.

And so I finally got to the train and reached the coast. I could not take the collection home myself, as I had to hurry off to the war; but I carefully put the specimens in paper "envelopes," these into biscuit tins, and these again into airtight tin uniform cases, with plenty of naphthaline, and packed them off by sea to England, where they arrived in a most satisfactory state.—C. A. SYKES, Capt. R.H.A.]

Family DANAIIDÆ.

1. TIRUMALA PETIVERANA (*Doubl. & Hewits.*). — *a*, ♂. Usoga; April, 1900.
2. DANAIS CHRYSIPPUS (*Linn.*). — *a*, ♂. Lamogi; November, 1899. *b*, ♂. Wadelai; January–March, 1900.
3. D. ALCIPPUS (*Cram.*). — *a*, ♂. Wadelai; January–March, 1900.
4. D. KLUGII (*Butl.*). — *a*, *b*, ♂. Wadelai; January–March, 1900. *c*, ♀. March from Usoga to Nandi; April, 1900.
5. D. DORIPPUS (*Klug*). — *a*, ♀. March from Usoga to Nandi; April, 1900.
6. AMAURIS DAMOCLES (*Pailsot de Beauvois*). — *a*. March from Usoga to Nandi; April, 1900.
7. A. ENCELADUS (*Brown*). — *a*, ♂. March from Usoga to Nandi; April, 1900.
8. NEBRODA ALBIMACULATA (*Butl.*). — *a*, *b*, ♂ ♀. March from Usoga to Nandi; April, 1900.

Family SATYRIDÆ.

9. MELANITIS LEDA (*Linn.*). — *a*, ♂. March from Usoga to Nandi; April, 1900.
10. MYCALESIS FUNEBRIS (*Guén.*). — *a*, *b*, ♂ ♀. Wadelai; January–March, 1900. *c*, ♀. March from Usoga to Nandi; April, 1900.
11. M. DESOLATA, *Butl.* — *a*, *b*, ♂ ♀. Lamogi; November, 1899.
12. M. ANGULOSA, *Butl.* — *a*, ♂. March from Usoga to Nandi; April, 1900.
13. M. PERSPICUA, *Trimen.* — *a*, ♂. March from Usoga to Nandi; April, 1900. *b*, ♀. Unyoro; March, 1900.
14. M. MIRIAM (*Fabr.*). — *u*, ♂. Wadelai; January–March, 1900.
15. M. SAUSSUREI, *Dewitz*, — *a*, *b*, ♂ ♀. March from Usoga to Nandi; April, 1900.
16. APHYSONEURA PIGMENTARIA, *Karsch*, *Ent. Nachr.* xx. p. 191 (1894). *Rhaphiceropsis pringlei*, E. M. Sharpe, *P. Z. S.* 1894, p. 336, pl. 19, figs. 1, 2. *a*. March from Usoga to Nandi; April, 1900.
17. YPETHIMA ALBIDA, *Butl.* — *a*. March from Usoga to Nandi, April, 1900.
18. Y. PUPILLARIS, *Butl.* *a*. Wadelai; January–March, 1900.
19. Y. ASTEROPE (*Klug*). — *a*, ♂. Lamogi; November, 1899.
20. Y. ITONIA, *Hewits.* — *a*, *b*. Lamogi; November, 1899.

Family ACRÆIDÆ.

21. *ACRÆA SERENA* (*Fabr.*).—*a*, ♂. Lamogi; November, 1899.
b, ♀. March from Usoga to Nandi; April, 1900.

22. *A. VINIDIA*, *Hewits.* *a*, *b*. Unyoro; March, 1900.

23. *A. BONASIA* (*Fabr.*).—*a*, *b*. Wadelai; January–March, 1900.
c. March from Usoga to Nandi; April, 1900.

24. *A. ALICIA*, *E. M. Sharpe.*—*a*. March from Usoga to Nandi; April, 1900.

25. *A. SYKESI*, *sp. n.*—Allied to *A. atergatis*, Westwood, and *A. gaekwari*, *E. M. Sharpe*; but is distinguished from the former by the much darker ground colour, and from the latter species by having no transparent patch on the primaries.

Primaries: Ground colour light chestnut-brown, the nervules black, the costa, apex, and hind margin narrowly edged with black, the cilia white; the spots, which are all black and well defined, are situated as follows: two in the discoidal cell, and one at the end of the cell; just beyond this a transverse band consisting of five spots between the nervules, the first four being all united; two small spots above the submedian nervure, and one somewhat larger between the first and second median nervules; near the hind margin a row of black streaks situated between the nervules, commencing above the submedian nervure; the basal area suffused with brownish black. Secondaries: The ground colour somewhat pinker in tint than that of the primaries; a distinct black border on the hind margin, the cilia white, the base dusted with black, and having three distinct black spots; an uneven row of small black spots crossing the discal area, each spot situated between the nervules, which are not black as in the fore wing. Under side: Ground colour much lighter, the apical area being paler; all the black spots and markings as on the upper surface, the hind marginal border being very narrow; near this border, situated between the nervules, are seven ochraceous coloured spots or streaks, the second one from the costa extending almost to the black transverse band on the upper side. Secondaries pale in colour, the whole of the basal area thickly spotted with black, and also, showing some pink spots; the black hind marginal border relieved by half-circles of yellowish-white spots. Expanse, 2 in. Wadelai; January–March, 1900.

Female.—General colour of both wings more tawny brown, the black spots on the primaries similarly situated as in the male, but larger, the submarginal row of streaks being more suffused; beyond the black band, on the apical side, a paler band is indicated. Secondaries lighter in colour, the black spots larger, and the hind marginal border broader. Under side agreeing exactly with that of the male above described, the pink spots on the secondaries having faded to a more ochre-yellow.

Expanse, 2·3 in. (Spec. ex White Nile. Consul Petherick; Mus. Brit.).

The collection in the Natural History Museum contains two males from Wadelai (collected in the months of March and April, 1887, by the late Emin Pasha), and the female above described, from the White Nile.

26. A. CABIRA, *Hopff.*—*a.* March from Usoga to Nandi; April, 1900.

27. A. DICE, *Drury.*—*a.* Wadelai; January–March, 1900.

28. A. INSIGNIS, *Distant.*—*a.* March from Usoga to Nandi; April, 1900.

29. A. PENELEOS, *Ward.*—*a-c.* March from Usoga to Nandi; April, 1900.

30. A. POMPONIA, *Grose Smith.*—*a.* Unyoro; March, 1900.

31. A. NEOBULE, *Doubl. & Hewits.*—*a.* March from Usoga to Nandi; April, 1900.

32. A. PUDORINA, *Staud.*—*a, ♂.* March from Usoga to Nandi; April, 1900.

33. A. NATALICA, *Boisd.*—*a-c, ♂.* March from Usoga to Nandi; April, 1900.

34. A. CÆCILIA (*Fabr.*).—*a-c, ♂ ♀.* March from Usoga to Nandi; April, 1901. *d, ♂.* Wadelai; January–March, 1900.

(To be continued.)

MISCELLANEA RHYNCHOTALIA.—No. 5.

By G. W. KIRKALDY, F.E.S.

Fam. GERRIDÆ.

HYDROMETRA AGENOR, sp. nov.

Brownish castaneous, a narrow median longitudinal very pale bluish grey line on pronotum, apical margin of pronotum black. Antennæ (except pallid base of first segment), apex of head, &c., black. Abdomen above shining black, connexivum flavo-stramineous, extero-lateral margin narrowly black. Abdomen beneath pale flavous, except the dark genital segments. Legs pale flavo-fuscous, tarsi and apices of femora and of tibiæ black. Elytra lurid, nervures black. Rostrum reaching to eyes, but not beyond; antennæ equal to about two-thirds of insect's length; anteocular part of head more than twice as long as the postocular; head somewhat dilated at apex, scarcely so at base; anteocular part of head four times as long as first segment of antennæ, third more than twice as long as the fourth, four times as long as the second, which is two-thirds longer than the first. Apex of anterior femur scarcely reaching to apex of head. ♂. Long. 13½ mill.

Hab. ECUADOR, Guayaquil (colln. Montandon).

Allied to *H. caraiba*, Guérin, but separable by the proportions of the antennæ, &c.

HYDROMETRA NAIADES, nom. nov.

= *H. mensor*, Champion, nec White.

Besides unimportant colour differences, Champion mentions "anteocular portion (of head) about twice as long as the post-ocular portion," while White describes *H. mensor* as "anteocular part not quite once and a half as long." As this proportion of the head is one of the most important characters in the specific differentiation of *Hydrometra*, it is impossible, at present at least, to retain the name *mensor* for Champion's species. White's type is unfortunately lost or destroyed, as is also that of *H. metator*.

RHEUMATOMETRA, gen. nov.

Allied to *Kallistometra*, Kirk., and *Halobatopsis*, Bianchi, but differing by the proportions of the antennæ, legs, &c.

Suboval; antennæ short, subequal to the pronotum in the winged form; first segment shorter than the other three together, fourth fusiform, one-fourth longer than the third. Apical segment of anterior tarsi three or fourth times as long as the basal; posterior femora a little longer than tibiæ and tarsi together; intermediate legs very long, tibiæ longer than femora, which are a trifle longer than tarsi.

Macropterous form: Pronotum slightly convex, rounded posteriorly. Elytra long, extending far beyond apex of abdomen.

Apterous form: Pronotum short, transverse.

R. PHILARETE, sp. nov.*

Velvety black; base of first segment of antennæ, a large spot in the middle of the anterior lobe of pronotum, lateral margins of the nota, the connexivum above, coxæ (in part), &c., bright luteo-flavous. Male anterior femora and tibiæ strongly curved and somewhat incrassate. Female anterior femora and tibiæ only slightly, if at all, curved or incrassate. Long. (to apex of abdomen), ♂ $2\frac{1}{4}$ mill., ♀ $4\frac{1}{2}$ mill.; lat. ♂ $1\frac{1}{8}$ mill., ♀ $2-2\frac{1}{4}$ mill.; long. to apex of elytra, ♀ 6 mill.

Hab. AUSTRALIA, Victoria, Alexandria (collns. Montandon and Kirkaldy).

MICROVELIA STELLATA, sp. nov.

Apparently allied to *M. albonotata*, Champion, but that species is described as not having the vertex longitudinally sulcate, and the colouring is somewhat different.

Elongate. Black; basal half of first antennal segment, basal three-fourths of femora pale flavescent. Anterior margin of pronotum (entirely) fulvous. Antennæ, elytra, and legs dark sienna-brown, the

* I have a revision of the Gerridæ in progress, where these and other forms will be described in more detail.

elytra being largely silvery white basally ; there are also seven or eight much smaller silvery spots from base to apex. Beneath black, connexiva fulvous. First segment of antennæ distinctly longer than second, fourth a little longer than third, which is one-fourth longer than second. Pronotum not carinate medianly. Long. $2\frac{1}{2}$ mill. ; lat. 0.85 mill.

Hab. ECUADOR, Guayaquil (collns. Montandon and Kirkaldy).

Fam. PYRRHOCORIDÆ.

ASTEMMA (DYSDERCUS) MIMUS (*Say*).

JAMAICA (C. B. Taylor).

Fam. MIRIDÆ.

MAKUA, gen. nov.

Belongs to div. *Capsaria*, Reuter.

Macropterous form: Impunctate, pronotum slightly rugulose. Vertex immarginate, not sulcate. Head strongly declivous, about as long as high ; clypeus confluent with the front, but well separated. Rostrum not reaching beyond intermediate coxæ. First segment of antennæ extending well beyond apex of head, distinctly shorter than the pronotum. Pronotal collar shorter than width of second antennal segment at base. Pronotum slightly transverse. Scutellum somewhat convex. Corium without supplementary nervures ; cuneus longer than wide at base. Greater membranal areole angulate-rotundate. Posterior femora short, not nearly reaching apex of abdomen, shortly hairy ; tibiæ with spiny bristles.

M. PSOLE, sp. nov.

Head, pronotum, scutellum, elytra, connexivum, ventral surface, and legs sordid luteo-testaceous ; pubescence whitish. Eyes, two basal segments of antennæ, tarsi, and apex of rostrum blackish. Clavus and corium (interiorly) dark purplish brownish ; pronotum laterally smoky. Corium intero-apically sanguineous, membrane dilute smoky, nervures sanguineous. Clypeus and narrow sublateral stripe on sterna sanguineous. Vertex about three-fifths wider than an eye, rounded apically (as seen from above) ; second segment of antennæ three times as long as first, and twice as long as pronotum (excluding collar). Long. $5\frac{1}{2}$ mill., lat. $1\frac{2}{3}$ mill.

MOZAMBIQUE, Rikatla.

PLEXARIS, gen. nov.

Belongs to *Capsaria*, Reut.

Strongly punctured. Head large, distinctly wider than half the base of pronotum. Vertex immarginate. Eyes not widely divergent apically. Second segment of antennæ slightly incrassate apically. Rostrum not reaching as far as posterior coxæ. Pronotum widely sinuate at the base, latero-posterior angles acute, base nearly four times as wide as the collar, lateral margins straight, widely diverging. Collar very slightly wider than the vertex at base. Scutellum convex.

Cuneus deeply incised, major areole of membrane widely rounded apically. Posterior femora short, not nearly reaching to apex of abdomen; first segment of posterior tarsi distinctly shorter than the second, third the longest.

Allied to *Deracecoris*. Stål, but distinguished by the large head, &c.

P. SATURNIDES, sp. nov.

Suboval; more or less shining black above and below; a triangular spot at base of vertex posterior to eyes, an elongate spot on vertex, middle third of second segment of the antennæ, postero-lateral margins of pronotum, a spot in middle of apical margin of pronotum, and the tarsi testaceous; a longitudinal narrow stripe on middle of basal half of pronotum fulvous. Tibiæ annulate alternately with black and white. Rostrum fusco-testaceous, apically black. Membrane hyaline, with a median curved band and the nervures black. Long. 5 mill., lat. 2 mill.

Hab. NATAL, Howick.

MEGINOE, gen. nov.

Belongs to *Capsaria*.

Subelongate; not (or only superficially) punctured. Scutellum rugose-punctured. Head strongly declivous. Vertex immarginate, very narrowly longitudinally sulcate, a little impressed subtransversely near the base. Clypeus somewhat prominent, not forming a continuous curve with the head. Eyes large, contiguous with pronotum, extending almost to internal margins of rostrum, second as long as high (in profile), posterior margin sinuately emarginate (in profile). Antennæ inserted almost at middle of eye (in profile). First segment of rostrum reaching to about the middle of prosternum, fourth segment extending beyond posterior coxæ. Pronotum one-half wider than head and eyes, base two and three-quarter times as wide as collar; one-third longer than length of head (profile); base subsinuately rounded widely; two small sharply marked rounded tuberculate callosities; lateral margins not reflexed. Collar somewhat narrow. Stink-orifices large, suboval, subauriculate. Major areole of membrane narrowly rounded apically. Cuneus longer than broad at base.

Not very closely allied to any other genus.

M. HOVANA, sp. nov.

Hairy and pubescent. Head pale sordid flavous, multistriate subrotundately, and clouded transversely with sanguineous. Pronotum pale luteo-flavous, mottled with brownish. Two subconfluent dark brown blotches in the middle of the basal margin of the pronotum; callosities black. Three apical segments of rostrum and the stink-orifices testaceous. Scutellum blackish brown, posterior angles pallid. Elytra fuscous, cuneus blackish brown, a broad curved pale yellow band across the middle. Membrane hyaline, fumate, nervures fuscous. Underneath pale fusco-fulvous, darkening laterally. Eyes prominent, each as wide as—or a little wider than—vertex between them. Vertex

(as seen from above) rounded anteriorly. ♀. Long. 7 mill., lat. $2\frac{1}{3}$ mill.

Hab. MADAGASCAR, Diego Suarez.

GUTRIDA, gen. nov.

Belongs to *Capsaria*.

Suboval; glabrous, abdomen above, &c., sparsely pubescent; pronotum and elytra punctured. Vertex marginate. Head vertical, about twice as wide (in profile) as high. Eyes (profile) more than one-half of the length of the head; first segment of antennæ extending beyond apex of head, inserted within the apical margin of the eyes. First segment of rostrum very short, reaching a little beyond base of head. Eyes contiguous with pronotum. Pronotum declivous, not or only very slightly callose anteriorly; base widely rounded (subsINUATELY), more than two and a half times as wide as the length of the first segment of antennæ, about four times as wide as collar, not quite twice as wide as head and eyes together. Lateral margins of elytra a little rounded, apical margin of corium extero-laterally reaching somewhat beyond base of cuneus, the latter a little declivous; membranal nervures angulately rotundate apically. Posterior femora not much stouter than the other pairs. Tarsi with bristly spines.

G. GABONIA, sp. nov.

Head, pronotum, and scutellum flavous, a subbasal elongate blackish brown spot in the middle. Eyes red-brown. Anterior angles of scutellum fumate. Elytra pale sordid yellowish, lateral margins of clavus widely dark, apical margin of corium clouded irregularly with brownish. Base and apex of cuneus blackish brown, membranal nervures fuscous. Head rounded apically (seen from above). Long. 6 mill., lat. $2\frac{1}{2}$ mill.

Hab. GABOON (ex coll. Montandon).

(To be continued.)

NOTES AND OBSERVATIONS.

GONEPTERYX RHAMNI, AB.—Mr. Sabine, of Erith, has kindly sent for inspection an example of *G. rhamni*, which is apparently a female, but the fore wings are tinged with the male colour, especially at the base and on the costal and hind marginal areas; the hind wings are very similar in colour to those of the male. The specimen was taken this year in the New Forest by Mr. L. W. Newman.

LYCÆNA CORYDON AB.—Ground colour of all the wings blackish. Fore wings have a black centred white discal spot and a series of six quadrate white spots on the submarginal area; the latter are dusted with black atoms, especially the lower three of the series, and are traversed by an interrupted, blackish, diffuse line extending from the inner margin to the third spot; the basal and central areas are heavily dusted with blue scales. The markings on the hind wings are some-

what similar to those of the fore wings, but the white spots on sub-marginal area are smaller and not so well defined; marginal spots white with blackish centres. The under surface of all the wings is very like that of a normal male. The specimen was taken at Wrotham in August last by Mr. W. A. Carter, and is now in the possession of Mr. Sabine.

VARIETY OF *VANESSA ANTIOPA*.—One of the imagines resulting from a batch of German larvæ of *Vanessa antiopa* bred by me this season is rather a remarkable variety, of which I can find no mention in my entomological books. On the upper wings there is a complete absence of the blue spots, and on each of the lower wings there is only one small blue spot. The specimen is somewhat smaller than the normal ones of the same brood, and I had noticed a sort of indentation on the wing-cases of the pupa, which led me to fear that the imago might not emerge. However, though it was not the first to pupate, it came through first, on July the 24th, having been sixteen days in the pupa state.—F. A. OLDAKER; Parsonage House, Dorking, Sept. 23rd, 1902.

TYPHLOCYBA COLORADENSIS IN MEXICO.—Dr. Bonansea Silvio has just sent me numerous specimens of this grape-vine leaf-hopper, collected at Ciudad Porfirio Diaz, Mexico. The insect is common in New Mexico, but is, I believe, new to the fauna of Mexico.—T. D. A. COCKERELL; Sept. 16th, 1902.

CAPTURES AND FIELD REPORTS.

COLIAS EDUSA AT BEXHILL.—In August last I took *C. edusa* near Bexhill—one male on the 13th, another male on the 16th, and a male and two females on the 20th.—P. TOWELL; Homesdale Road, Teddington.

COLIAS HYALE AND *C. EDUSA* IN KENT.—As far as I can ascertain, only the early brood (consisting of immigrants) of *C. hyale* has appeared this year at Sheerness, the headquarters of this species. My informant, Mr. E. Griffiths, very kindly sent me all his captures, which amounted to seven specimens, consisting of six males and one female (which proved infertile). These he captured on June 27th, 29th, and July 12th. He now informs me he has not seen one *C. hyale* since the latter date, and that *C. edusa* has been scarce, having only seen ten altogether, three of them in June. The above is interesting, showing how unsuitable a cold English summer is for the existence of these butterflies.—F. W. FROHAWK; October, 1902.

I noticed two specimens of *Colias edusa* at Folkestone in August of this year, on the golf links.—HAROLD HODGE; 9, Highbury Place, N.

While staying at Folkestone the first fortnight of September, I captured a few *Colias edusa*, one var. *helice*, and four *C. hyale*.—W. E. BUTLER; Hayling House, Reading, October 4th, 1902.

COLIAS EDUSA, &c., IN SUSSEX.—My boy caught here, in September last, four male *C. edusa*, in quite fresh condition; also about six *Vansesa cardui*, and four *V. io*, in equally good condition. The latter insect only turns up occasionally here. It has been a very bad year for insects; treacle and light absolutely useless. I collect on my

small estate of four hundred acres, on which are about a hundred acres of wood, chiefly oak. Since I came here, five years ago, my experience has been very disappointing. Both treacle and light seem to be losing their power of attracting. I shall be glad to hear from some of your correspondents, whether they have had a similar experience in other parts of the country. I live about two miles and three-quarters from Hayward's Heath, in a country which looks very suitable for collecting, but I have not found it so. *V. atalanta* has been very scarce this year, as it was last. Two years ago it swarmed.—A. H. RYDON; Awbrook, Lindfield, Sussex, Oct. 4th.

COLIAS EDUSA IN CORNWALL.—I noticed two specimens of *C. edusa* in September of this year, on the West Cornwall golf-links at Lelant, Hayle, Cornwall.—HAROLD HODGE; 9, Highbury Place, N.

SESIA MYOPIFORMIS IN LONDON.—I took a perfect specimen of *S. myopiiformis* in the garden of this house early in June last. There are several pear-trees in the gardens about here, one quite close by of great size and age. But, though I have observed the insects in this garden for over fourteen years, I have never seen *S. myopiiformis* here before.—HAROLD HODGE; 9, Highbury Place, N.

CAPTURE OF *SESIA ALLANTIFORMIS*, Newm. (= *ANDRENIFORMIS*, Lasp.) IN DORSETSHIRE.—On August 23rd I swept a male of this grand addition to our county fauna at Glanvilles Wootton, off feverfew flowers. This enables me to state that my specimen from the New Forest, recorded as *Sesia conopiiformis* (Entom. vol. xxvii. pp. 245, 342; vol. xxix. p. 185), is the female of *S. andreniformis*. Laspeyres, in his work on European Sesiidæ, states that he has not seen the female. This sex differs from the male in having three instead of two yellow rings round the abdomen, and in having a black anal tuft with a few yellow hairs on each side instead of the yellow tuft so characteristic of the male. Like the male, the femora are violet black, but the tibial portions of the legs are yellow.

Previous records of *S. allantiformis*:—1. By Mr. Chant, in a wood near Greenhithe, in July, 1829 (Ent. Mag. vol. i. p. 80). 2. By Mr. Harding, also near Greenhithe, in July, 1846 ('Zoologist,' vol. iv. p. 1515). 3. By Rev. A. H. Wratishaw, between Dover and Folkestone, in 1859 (Entom. vol. iv. p. 214). 4. By Rev. A. M. Matthews, near Market Harborough, in 1868 (Newman's 'Moths,' p. 15). 5. By Master Jenney, near Tring, on July 15th, 1876 (Entom. vol. ix. p. 204). 6. By R. C. L. Perkins, at Wootton-under-Edge, in 1886 (Entom. vol. xx. p. 108). 7. Two, by Mr. Davis, at Dover, on July 10th and 14th, 1889 (Entom. vol. xxii. p. 211).—C. W. DALE; Glanvilles Wootton, August 27th, 1902.

PIERIS DAPLIDICE IN SUSSEX.—Mr. A. Wood records in the 'Field' the capture of *P. daplidice* on August 29th, 1902, near the racecourse at Brighton.—F. W. F.

PAPILIO MACHAON IN BERKS.—Mr. A. Wood reports in the 'Field' a specimen of *P. machaon* captured near Wellington College station in July, 1902.—F. W. F.

LYCÆNA ARGOLUS AT ROTHERHITHE.—I captured a male specimen

of *L. argiolus* in this vicarage garden on Aug. 22nd last, as it was flying around some ivy, of which there is a quantity in the garden; one *Pieris napi* and a few *Vanessa urticae* also seen here. There is nothing like a garden nearer here than Southwark Park, which is a good mile away.—H. W. SWEETING; Holy Trinity Vicarage, Rotherhithe, S.E., Oct. 17th, 1902.

DICYCLA OO, &C. IN MIDDLESEX.—On July 27th I took *D. oo* at rest on the trunk of an oak at Palmer's Green. I should like to know if this insect has been taken in Middlesex before. I also took, on Sept. 3rd, *Calymnia diffinis* and *Noctua c-nigrum*, in the same locality, at sugar, and a friend of mine took *Pararge megara* at Potter's Bar on Sept. 7th.—LAURENCE S. HODSON; 8, The Villas, Palmer's Green, Sept 11th, 1902.

DICYCLA OO IN KENT.—I was very pleased to read of Mr. Browne's capture of this species near Chislehurst, as recorded in the last number (*ante*, p. 267). It occurred very plentifully at Bromley (adjacent to Chislehurst) in 1888, when the late Mr. Collins, of that town, took a great number at sugar, a portion of my own series being some of them; but, strange to say, in spite of much annual sugaring near the "old" ground (now built over), it has never been seen since, to my knowledge, so that Mr. Browne's record proves without a doubt that it still occurs near its old locality.—A. J. LAWRENCE; 76, Samos Road, Anerley, S.E. (late of Ladywell).

DEILEPHILA LIVORNICA IN SOUTH DEVON.—On July 22nd last, just as I was leaving home for Devonshire, I received from Starcross a full-grown Sphingid larva, found by a boy as it was crawling in a lane. At first sight this appeared to me closely to resemble the dark form of *Deilephila galii*. On arriving at my destination I supplied it with *Galium verum* and *G. mollugo*, but it had ceased feeding, and made at once preparation for pupating. It then occurred to me that the time was too early for *D. galii*, and later on, when referring to my books, I found that the description of *D. livornica* tallied with my larva. On Sept. 27th, however, all my existing doubts were dispelled, as on that day a perfect imago of *D. livornica* emerged. During a recent visit to Starcross I ascertained the locality, which is a lane where *G. mollugo* grows in profusion, on which the larva had probably been feeding. I am told that there is no record of this rare moth having been previously found in the larval state in Britain.—J. JÄGER; 65, Saint Quintin's Avenue, North Kensington, Oct. 4th, 1902.

CHEROCAMPA CELERIO IN HAMPSHIRE.—On Sept. 27th I had a living specimen of *C. celerio* brought to me to name, by Miss Stevenson, of Reading (a young collector), who informed me it was sent to her, by post, by some friends who know nothing about entomology, and was taken on Lady Munday's estate, Emsworth, Hants, two days previously.—W. E. BUTLER; Hayling House, Oxford Road, Reading, Oct. 5th, 1902.

LATE EMERGENCE OF CUCULLIA ASTERIS.—This species generally emerges in June, July, and the early part of August, the larvæ in the Essex marshes being found on *Aster tripolium* until quite late in September. This year the imago has continued to emerge during

September, culminating with a very fine perfect specimen bred to-day, September 23rd. This seems to me worthy of record, as the progeny of such late specimens would assuredly perish, as even by the time when the ova hatched the flowers of the sea aster and the alternative food-plant *Solidago virgaurea* would be unobtainable.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex, Sept. 23rd, 1902.

MESOTYPE VIRGATA (LINEOLATA) IN BERKSHIRE.—I am very pleased to add this species to the list of Lepidoptera occurring in the county of Berks. I took one example on August 4th last, on one of the chalk hills near Streatley.—W. E. BUTLER; Hayling House, Reading, Oct. 4th, 1902.

AGROTIS OBELISCA: A CORRECTION.—The species recorded by me as *Agrotis obelisca* (*ante*, p. 269) has been wrongly determined, and I now find that it is *A. tritici*. I much regret having been led into this error of identification.—G. B. BROWNE.

AGRILUS SINUATUS IN HAMPSHIRE.—During the second week in August this year, I had the fortune to take eleven specimens of *A. sinuatus*. Two were sunning themselves on some willow leaves, the rest I obtained off one hawthorn bush by beating. This was in Hurst Wood, near Lyndhurst, New Forest. I beat a good many shrubs and trees, but came upon no more of this species. I should like to know upon what the larvæ feed. I and my companion also beat three *Acronycta alni* larvæ in their final skin, and two *Stauropus fagi* in their second skin.—F. N. HITCHCOCK; Ben Omar, South Road, Clapham Park, S.W.

THREE WEEKS IN SOUTH DORSET.—Early in July, Dr. H. M. Stewart and I started off for a holiday in South Dorset, determined to spend a large portion of our time in entomological pursuits. The subjoined list of one hundred and forty-two species of Lepidoptera show that there is a large variety of insects to be met with there, and had the weather been kinder there is no doubt that the list would have been largely augmented.

Of the butterflies, *Hesperia actæon* was exceedingly plentiful in its restricted localities, while *Melanargia galatea* and *Satyrus semele* swarmed on the cliff-sides. *Limenitis sibylla* was seen in sheltered situations near the woods, and *Pieris napi* was coming out in numbers as we left. *Euchelia jacobææ* was very common in the lanes, while the woods gave us plenty of *Lithosia deplana* and *L. lurideola*. Sugaring, sadly interfered with by stormy winds, yielded *Agrotis lunigera*, *Thyatira devasa*, and the commonest insects at it being *Dipterygia scabriuscula*, *Agrotis exclamationis*, and *Xylophasia monoglypha* (*polyodon*). Fences and trunks produced *Hecatera serena* and *Hadena dentina* in considerable numbers, also *Cucullia umbratica* and numerous Geometrid moths. The heaths swarmed with *Plusia gamma*, while both *Anarta myrtilli* and *Heliothis dipsacea* were in some numbers. June would, I believe, be a very good month there in a normal season, and we hope to test it another year.

Rhopalocera:—*Pieris brassicæ*, *P. rapæ*, *P. napi*, *Argynnis euphrosyne*, *A. aglaia*, *A. adippe*, *Vanessa urtica*, *V. atalanta*, *V. cardui*, *Limenitis sibylla*, *Melanargia galatea*, *Satyrus semele*, *Epinephele ianira*,

E. tithonus, *Cænonympha pamphilus*, *Thecla rubi*, *Chrysophanus phlaeus*, *Lycæna ægon*, *L. icarus*, *Hesperia actæon*, *H. sylvanus*.

Heterocera :—*Hemaris fuciformis*, *Trochilium crabroniformis*, *Zygæna loniceræ*, *Lithosia deplana*, *L. lurideola*, *Emydia cribrum*, *Euchelia jacobææ*, *Spilosoma lubricipeda*, *Hepialus humuli*, *H. hectus*, *Porthesia similis*, *Malacosoma neustria*, *Odonestis potatoria*, *Thyatira batis*, *T. derasa*, *Acronycta psi*, *A. aceris*, *A. megacephala*, *Leucania conigera*, *L. lithargyria*, *L. comina*, *L. impura*, *L. pallens*, *Xylophasia lithoxylea*, *X. monoglypha*, *X. hepatica*, *Dipterygia scabriuscula*, *Cerigo matura*, *Mamestra sordida*, *M. brassicæ*, *Apamea didyma*, *Miana strigilis*, *M. bicoloria*, *Grammesia trigrammica*, *Caradrina morpheus*, *C. alsines*, *C. taraxaci*, *Rusina tenebrosa*, *Agrotis suffusa*, *A. segetum*, *A. lunigera*, *A. exclamationis*, *A. corticea*, *A. nigricans*, *Noctua triangulum*, *Triphæna ianthina*, *T. fimbria*, *T. comes*, *T. pronuba*, *Orthosia upsilon*, *Hecatera serena*, *Euplexia lucipera*, *Phlogophora meticulosa*, *Aplecta nebulosa*, *Hadena dentina*, *H. trifolii*, *H. oleracea*, *Cucullia umbratica*, *Gonoptera libatrix*, *Habrostola tripartita*, *Plusia gamma*, *Anarta myrtilli*, *Heliothis dipsacea*, *Acontia luctuosa*, *Phytometra viridaria*, *Zanclognatha tarsipennalis*, *Hyppena proboscidalis*, *Uropteryx sambucaria*, *Rumia luteolata*, *Metrocampa margaritaria*, *Ellopiæ prosapiaria*, *Pericallia syringaria*, *Amphidasys betularia*, *Boarmia repandata*, *B. gemmaria*, *Tephrosia biundularia*, *Gnophos obscuraria*, *Pseudoterpna pruinata*, *Nemoria viridata*, *Hemithea strigata*, *Acidalia dimidiata*, *A. bisetata*, *A. dilutaria*, *A. virgularia*, *A. marginepunctata*, *A. imitaria*, *A. aversata*, *Cabera pusaria*, *C. ecanthemata*, *Macaria liturata*, *Bupalus piniaria*, *Abraxas grossulariata*, *Lomaspilis marginata*, *Larentia viridaria*, *Eupithecia castigata*, *E. subnotata*, *E. minutata*, *E. tenuiata*, *E. pumilata*, *Thera variata*, *T. firmata*, *Hypsipetes sordidata*, *Melanthia bicolorata*, *M. ocellata*, *M. albicillata*, *Melanippe procellata*, *M. unangulata*, *M. rivata*, *M. sociata*, *M. galiata*, *M. fluctuata*, *Anticlea rubidata*, *Camptogramma bilineata*, *Phibalapteryx tersata*, *Cidaria immanata*, *C. dotata*, *C. associata*, *Eubolia limitata*, *E. plumbaria*, *Anaitis plagiata*, *Tanagra atrata*.—E. E. B. PREST; Arva, Dacres Road, Forest Hill, S.E.

LEPIDOPTERA AT THE NEW FOREST IN JUNE.—So much has been said and written of this glorious hunting-ground that I am afraid I can add little that will be of interest. I arrived at Brockenhurst on June 15th, and my first capture was *Hadena genistæ*, at rest on a paling, on my way to our rooms. Needless to say, perfect insects were very backward, and the species that are usually so plentiful in this district at this time of the year were conspicuous by their absence. Larvæ-beating (which I went principally for), on the other hand, was fairly profitable, the following species occurring—mostly from oak—every day during my stay:—*Thecla quercus*, common; *Limenitis sibylla*, larvæ and pupæ fairly plentiful on honeysuckle around tree-trunks; *Nola strigula*, fairly plentiful, very few emerging after successfully pupating; *Liparis auriflua* and *L. monacha*, very common; *Lithosia quadra*, plentiful, but fearful cannibals in confinement; *Malacosoma neustria*, occasionally; *Pericallia syringaria*, a few on honeysuckle; *Himera pennaria*, *Phigalia pilosaria*, and *Amphidasys prodromaria*, all plentiful; *Cleora lichenaria* and *C. glabraria*, occasionally on the lichens, but difficult to find; *Phorodesma bajularia*, very scarce, I only

got two; easily overlooked, owing to its remarkable resemblance to refuse and bits of dead leaves, &c., with which it covers itself; *Cheimatobia brumata*, in swarms, a positive nuisance; several species of the genus *Eupithecia*, difficult to recognize, possibly *E. irriguata* occasionally; *Hybernia defoliaria*, very common, difficult to get into pupæ successfully; *Petusia cassinea*, a few at night on blackthorn, &c.; *Notodonta chaonia*, occasionally, from oak; *Cymatophora flavicornis*, very local—I got seventeen full-fed larvæ from a solitary birch in Stubby Copse on June 20th; *C. ridens*, very few compared with other years; several species of *Taniocampa*, especially *T. miniosa*, rather common; *Anchocelis rufiga*, occasionally; *Scopelosoma satellitia*, very common; often found in one's pockets after a day's beating; the same remarks applying to *Cosmia trapezina*; *Agriopis aprilina*, sometimes at sugar at dusk. *Catocola promissa* and *C. sponsa* were also plentiful, and I successfully reared all those I obtained. I was too late for heather-searching, and missed *Agrotis agathina* and *Noctua neglecta*, although I did obtain one full-fed larva of the former on my return home across the moor on June 19th, but it unfortunately died. Why is this species so difficult to rear? I have tried them now for several years in succession, but without any success. *Genista angelica* produced *Pseudoterpnæ cytisaria*, which were very plentiful, especially near Jones's Enclosure, Lyndhurst, and at the foot of Hurst Hill, Brockenhurst. What struck me very much on entering the enclosures was the fearfully barren state of the oak. Gazing at the gaunt leafless branches overhead reminded one more of Christmas than of mid-summer. Late frosts and countless larvæ had, no doubt, wrought the mischief. It is really a marvel how the latter thrived at all on practically bare branches (which when beaten, strange to say, produced the most larvæ). Probably the lichens are resorted to as a last resource by larvæ. Butterflies were few, only *Argynnis euphrosyne*, *Gonepteryx rhamni*, and *Syrichthus alveolus* appearing in any numbers worth mentioning, with occasionally a stray *Nemeobius lucina* just to relieve the monotony. *Macrothylacia rubi* (males) were occasionally seen, and on June 18th a turf-cutter gave me a very nice female, which he had found on the heather. *Lithosia rubricollis* made up for many disappointments; I was fortunate enough to take forty altogether, mostly found drying their wings on bracken at Aldridge and Hurst Hill. *Macroglossa fuciformis* and *M. bombyliiformis* were fairly plentiful on sunny days in the Ornamental Drive, Rhinefields, at rhododendron and azalea bloom. At light, the only visitors that put in an appearance were *Chelonia villica* (very fresh) and a few "daddy long-legs." Lastly, at sugar the following occurred:—First and foremost "ye hornet," and extremely formidable ones too; and then, in their Doubl. List order: *Charocampa elpenor*, several each evening; *Lithosia rubricollis*, one; *Thyatira batis*, common; *Diphthera orion*, three, turning up about 10 p.m.; *Miana strigilis*, two; *Grammesia trilinea*, three, and one var. *bilinea*; *Taniocampa gothica*, one, just out apparently, and two months overdue; *Euplexia lucipara*, one; *Aplecta herbida*, common; and *Erastria fuscula*, common and easily mistaken for *M. strigilis*. Several species of Coleoptera, Diptera, &c., occurred, but, as I do not collect these, I am sorry to say I cannot name them; some were new to me, and most extraordinary. As was the case last

year, sugaring was very bad indeed, the results being extremely poor. *Leucania turca*, which I felt almost certain of getting, was either not out, or extinct, at Hurst Hill. The weather, too, taken on the whole, was shocking—rain almost every day; so, packing up my baggage, I left on Tuesday, June 24th, having only spent ten days in Brockenhurst, where I had intended spending a whole fortnight.—A. J. LAWRENCE; 65, Malyon Road, Ladywell, S.E., Sept. 16th, 1902.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—October 1st, 1902.—The Rev. Canon Fowler, M.A., D.Sc., F.L.S., President, in the chair.—Mr. H. St. J. Donisthorpe exhibited specimens of *Dibolia cynoglossi*, taken by him near Pevensey on the 11th August last. He said that the beetle had not been recorded as British since 1866.—Mr. O. E. Janson exhibited a fine hermaphrodite specimen of *Argynnis paphia*, taken in the New Forest by Mr. Herbert Charles on July 28th, and recorded in the 'Entomologist'; also a melanic specimen of *Papilio demoleus*, from Ceylon, in which all the usual marginal and submarginal yellow markings were absent and the discal markings much obscured; on the under side the yellow markings were entirely wanting.—Mr. C. P. Pickett exhibited a male *Callimorpha dominula* with the hind wings suffused with black, and an extra black spot in the centre, the white spot on the fore wings being absent; and a very large female of the same species, both bred from larvæ found at Walmer at the end of March; and three aberrant specimens of *Triphæna fimbria*, bred from larvæ taken at Wood Street during the same month.—Mr. C. O. Waterhouse exhibited specimens of a wasp (*Zethus chalybeus*) and a neuropteran (*Mantissa semihyalina*), received with a collection of Hymenoptera from Rio Janeiro, suggesting a curious case of mimicry.—Mr. F. B. Jennings exhibited specimens of *Hister merdarius*, from Broxbourne, Herts, part of a large colony of this usually scarce species found with *H. 12-striatus* and other beetles inhabiting a heap of a chemical substance, probably gas-lime, in which also many larvæ, presumably of *H. merdarius*, and burrows, were observed. The soil was warm and moist, and this, and the presence of a quantity of vegetable refuse thrown on the heap, was no doubt the attraction to the Histers to settle there.—Mr. A. J. Chitty exhibited a specimen of *Metoeus paradoxus* with a part of the cells of a nest of *Vespa vulgaris*, in which place the beetle is invariably found. The beetle in the cell tucks in his head, only displaying on the surface the thorax, which is coloured similarly to the face of the wasp. This peculiarity suggests a case of mimicry, and Professor Poulton, F.R.S., said that it fitted in with the case of some other bees and wasps.—Mr. H. Rowland-Brown exhibited, on behalf of Mr. G. F. Leigh, of Durban, a female and male specimen of a rare noctuid, *Musgravia leighi*, Hampson, discovered by him in Natal, and read remarks upon the life-history of the species, communicated by the captor.—Mr. Stanley W. Kemp exhibited two additions to the British list of Coleoptera—*Bembidium argentiolum*, from Lough Neagh, Armagh; and

Læmostenus complanatus, from the neighbourhood of Dublin—taken in June, 1902.—Mr. W. J. Kaye exhibited examples of *Heliconius lindigii*, *H. antiochus*, and *Morpho achilles*, from British Guiana, with notches taken out of the hind wings, presumably by birds; to illustrate that these distasteful or warning-coloured species are subject to attack, this helping to show that experimental tasting, as propounded by the Müllerian theory of mimicry, does exist and go on.—Professor L. C. Miall, F.R.S., communicated a paper by Mr. T. H. Taylor, M.A., entitled “The Tracheal System of *Simulium*.”—Professor Auguste Forel, M.D., communicated a paper entitled “Descriptions of some Ants from the Rocky Mountains of Canada (Alberta and British Columbia) collected by Edward Whymper.”—Dr. T. A. Chapman read a paper entitled “On *Heterogynis paradoxa*.”—H. Goss and H. ROWLAND-BROWN, *Hon. Secretaries*.

October 15th.—Professor Edward B. Poulton, M.A., D.Sc., F.R.S., Vice-President, in the chair.—Mr. A. J. Chitty showed an entirely black specimen of *Metoeus paradoxus*, as tending to disprove the mimicry suggested by him at the meeting on Oct. 1st. Dr. Chapman said that in his experience one out of every six specimens of this species was black. Mr. Donisthorpe stated that out of about one hundred specimens he had never caught or bred a black *Metoeus*.—Mr. E. P. Pickett exhibited a variety of the female of *Argynnis aglaia*, varieties of *Satyrus ianira*, and a long series of *Lycæna corydon*, taken near Folkestone and Dover in August last, including four males of the last-named species, with the black band on the edge of the fore wings much deeper than usual; also twelve dwarf male specimens of this species, four dwarf females, and many other aberrant forms. Mr. Goss said this dwarf form of *L. corydon* occurred constantly, according to Mr. Sydney Webb, in one valley about two miles east of Dover, but he was unaware of its regular occurrence elsewhere in this country. He remarked that a dwarf form of *L. arion* occurred wherever the type was found, both in Gloucestershire and Cornwall. Professor Poulton, Dr. Chapman, and Mr. Sloper also remarked on the dwarf forms of *L. corydon*.—Dr. Chapman exhibited specimens of *Notodonta (Hybocampa) dryinopa* from Queensland. It was remarkably similar in appearance, structure, and habits to *Hybocampa milhauseri* (see ‘Entomologist,’ 1889, and p. 43 of 1902). He stated that the pupa with a similar spine to that of *H. milhauseri* does not cut out a regular oval lid from the cocoon like that species, but by a stabbing process pierces it with a number of holes, so that a piece is more easily pushed off. The cocoon being covered with bits of bark, stone, &c., a cutting process would be impossible, whereas the cocoon of *H. milhauseri* was of pure gum-like silk. He pointed out that the larva much resembled that of *H. milhauseri*, but the hinder segments were more like those of *Stauropus fagi*. He also exhibited living eggs, larvæ, and imagines of *Orina tristis* var. *smaragdina*, from Pino, Lago Maggiore. The beetles, since they were taken on May 30th, had laid many eggs. Dr. Chapman said that the embryo, ready to hatch, might be seen within some of the eggs, and its hatching spines observed. Mr. Sloper exhibited a specimen of *Lycæna hylas*, said to have been caught at Dover on the 7th September last.—Mr. Martin Jacoby communicated a paper entitled “A further Contribution to our Knowledge

of African Phytophagous Coleoptera.'—Mr. Malcolm Burr read a communication from Hofrath Dr. Carl Brunner von Wattenwyl, entitled "Observations sur le nom générique *Acrida*."—H. Goss, *Hon. Secretary*.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —

September 11th.—The President in the chair.—Mr. South exhibited a series of *Pygæra curtula*, bred from ova laid by a large silver-grey female taken at Batchworth. The larvæ were fed on poplar, and the imagines were all small and dark in colour.—Mr. Turner, two Longicorn Coleoptera taken by Mr. Tutt at Torre Pellice—viz. *Cerambyx heros* (*cerdo*) and *Purpuricenus koehleri*.—Mr. Kemp, numerous species of Coleoptera taken in the New Forest in August, including *Prionus coriarius*, *Halysia 16-guttata*, *Abdera bifasciata*, *Bembidium decorum*, *Tomoxia biguttata*, and *Deronectes latus*.—Dr. Chapman, examples of the Hesperid *Heteropterus morpheus*, from St. Jean de Luz, and cases and imagines of the Psychid *Oreopsyche leschenaulti* from San Sabastian.

September 25th.—The President in the chair.—Dr. Chapman exhibited typical examples of *Euchelia jacobææ*, bred from larvæ found at Bejar, and stated that the black bands or rings of the larvæ were broken into four black marks.—Mr. Kaye, a short series of *Leucania albipuncta*, from the Isle of Wight, taken this year. Mr. Kirkaldy, a remarkable case of insect mimicry in a number of Brazilian Rhynchota. *Mabelia pulcherrima*, a new species of Miridæ, was shown with the Pyrrhocorine *Theraneis oleosus*, from Costa Rica, and *T. luridus*, from Brazil.—Mr. Kemp, species taken by him at various field-meetings of the Society:—Wisley, July 5th, Coleoptera: *Donacia thalassina*, *Pæderus riparius*, *Agrius angustatus*, *Xyloborus dryophagus*, and *Antherophagus nigricornis*. Odonata: *Orthetrum cærulescens*. Epping Forest, Sept. 20th, Coleoptera: *Zeugophora flavicollis* and *Ilybius fenestratus* Oxshott, Sept. 6th, Coleoptera: *Hydaticus seminiger*, *Pelobius tardus*, *Ilybius ater*, *Rhantus bistriatus*, *Bidessus geminus*, *Hydroporus tristis*, *H. umbrosus*, and *Cælambus impresso-punctatus*.—Mr. Lucas, a coloured sketch of a var. of *Asphalia ridens*, bred from the New Forest. The contrast of light and dark markings was unusually strong. He also showed a specimen of a very rare Dipteron, *Physocephala nigra*, and a female of *Ectobia lapponica*, with its egg-capsule, which it had carried protruding for five days before dropping it. Mr. Colthrup, *Lasiocampa quercus* vars. (1), with splashes of yellow at base of fore wings; (2), male with male antennæ and wings, but body showing ova through abdomen; (3), with yellow band on hind wing extending to fringes; also *Agrotis corticea*, with a white submarginal band on the fore wings.—Mr. Lucas read the report of the field-meeting held at Wisley on July 5th, and exhibited lantern slides to illustrate his remarks.

October 9th.—The President in the chair.—Mr. Jennings, four rare species of Coleoptera:—*Cathormiocerus socius*, from Sandown, Isle of Wight; *Gymnetron liniaræ*, from Southport; *Baris lapidii*, from Edmonton Marsh; and *Hister merdarius*, from Broxbourne.—Mr. Kemp, examples of *Carabus violaceus* var. *exasperatus*, from North Cornwall and the New Forest.—Mr. R. Adkin, a *Cossus ligniperda* from the same fence referred to in the 'Proceedings' for 1889 and 1900, and read notes.—Dr. Chapman, imagines, pupæ, and cocoons of *Hybocampa* (*Notodonta*) *dryinopa*, from Queensland.—Mr. South, four aberrations of

the female of *Lycæna corydon*, including two fine examples of var. *syngrapha*; all were taken by the Rev. C. A. Sladen, in Wiltshire. He also exhibited, on behalf of Mr. Robinson, of Boscombe, Hants, *L. minima*, almost devoid of markings on the under surface, from Swanage, and *Ematurga atomaria*, a melanic male from Bournemouth. *Zonosoma pendularia*, four specimens from Market Drayton, of a dark gray form, said by Mr. Woodforde to be typical of the district; also a specimen of the rare *Pyralis lienigialis* taken near Oxford, Aug. 22nd, 1902, and sent to Mr. South for identification, by Mr. Robinson.—Mr. Clark, a large number of slides illustrative of his paper entitled “Contributions to the life-history of *Argulus foliaceus*, the parasite of the stickleback.”—HY. J. TURNER (*Hon. Rep. Secretary*).

RECENT LITERATURE.

Catalogue of the described Orthoptera of the United States and Canada.
By S. H. SCUDDER. (Proc. of the Davenport Acad. of Nat. Sciences, vol. viii.) Oct. 1899.

Though somewhat late in reaching us, this useful pamphlet is not less welcome. We find that the total number of species at present known for the United States and Canada is about eight hundred and fifty-six, nearly double that given in Brunner's ‘Prodromus’ for Europe, while of course there is more scope for additions there than in Europe. Four of the earwigs, five cockroaches, and the house cricket are either British insects, or have at least been taken here. What appears to be a useful synonymy accompanies each species, and there is an appendix giving descriptions of eleven new species, and illustrated by three good plates.

W. J. L.

The Tettigidae of North America. By JOSEPH LANE HANCOCK.
Chicago. 1902.

Preceded by an excellent and lengthy introduction treating of the habits, anatomy, &c., of a family of rather curious grasshoppers, and followed by many notes on vivarium experiments, this splendidly got up monograph of one hundred and ninety pages will be read with interest by all students of the Orthoptera who are able to procure it. Each species, some eighty-seven in all, is fully treated, and the work is enriched by a number of illustrations in the text, and eleven plates, several being very beautifully executed photogravures. Periodically revisions and monographs of parts of the American Orthoptera appear. In the pages of the ‘Entomologist,’ Scudder's ‘Revision of the Melanopli’ has already been noticed, while we have before us an excellent illustrated ‘Revision of the Truxalinæ of North America,’ by Mr. Jerome McNeill (Nov. 1895), which has not previously been noticed in these pages. The treatment of the latest group to be looked after—the Tettigidae—shows up well in company with the rest.

W. J. L.

Faune Analytique illustrée des Orthoptères de France. By C. HOULBERT. Paris. 1900.

The present is a suitable opportunity for calling attention to a cheap publication extracted from the 'Feuille des Jeunes Naturalistes,' année 1900. It consists of short descriptions of the French Orthoptera, and a very large number of sufficiently well-drawn figures. As the French Orthoptera contains practically the whole of the British, this treatise should be of considerable use to British orthopterists as well as to their French brethren.

W. J. L.

Aquatic Insects in the Adirondacks. (Bulletin No. 47, New York State Museum.) By J. G. NEEDHAM. Albany, U.S.A. Sept. 1901.

In this bulky and extremely interesting bulletin we have the result of ten weeks spent by Dr. Needham and his assistant, Mr. C. Betten, in examining the aquatic insect fauna of this district in the north-east of the State of New York. Dr. Needham's work, especially in connection with the Neuroptera, is getting well known amongst English entomologists, and by them this report will be read with interest. The entomological field-station in the Adirondacks was taken up "to collect and study the habits of aquatic insects, paying special attention to the conditions necessary for the existence of the various species, their relative value as food for fishes, the relations of the forms to each other, and their life-histories." Accordingly, "the routine work of the station consisted in collecting and studying aquatic insects in all their stages of development, in conducting feeding experiments, in making quantitative studies of the life of certain situations, in gathering the materials for the study of the natural and habitual food of trout, bullfrogs, and some of the larger species of dragon-flies, in running trap-lanterns, and sending their nightly catch to the State museum, &c." As a result, about one hundred life-histories were worked out in more or less detail, material additions were made to the list of insects occurring in the State, while ten new species and two new genera were discovered. In the 213 pages of text there are forty-two illustrations, while there are in addition no less than thirty-five plates, several of being them coloured. Would not many of the remote and less-known British and Irish lakes repay similar close attention?

W. J. LUCAS.

Genera Insectorum. (Published by P. Wytzman, Brussels.) Fasc. 3: Coleoptera Clavicornia, Fam. Lathridiidae, by R. P. BELON. Pp. 1-40; 1 Plate.—Fasc. 6: Lepidoptera-Rhopalocera, Fam. Papilionidae, sect. Troides, by R. H. F. RIPPON. Pp. 1-15; 2 Coloured Plates. (1902.)

The plan of this work is to provide a systematic account of all the genera of the Insecta, including a list of Species. Having regard to our fragmentary knowledge of certain families, considerable time must necessarily elapse before the completion, but if all the groups are treated in the same manner as those before us, the work will retain a

very high position in entomological literature. The paper is substantial and the printing clear, while the size is convenient. We have only two parts for review, but apparently each part is paged separately and complete in itself. After a general survey of classification, a key to the genera is given, followed by a description of each genus, a list of their several species (with synonymy), accompanied by their geographical distribution. The third fascicule summarizes the Lathridiidae, a family of tiny clavicorn beetles, of which 5 tribes are accepted, containing 22 genera and 435 species; these are elucidated by a plate containing 28 species. The sixth fascicule is treated in a more sumptuous fashion, being adorned with two plates, embracing some fourteen coloured figures and eight details of venation. Six genera of "Troides" (Ornithoptera, &c.) are upheld, and 46 species are enumerated, of which, however, little more than thirty are considered by Rippon to be good species.

G. W. K.

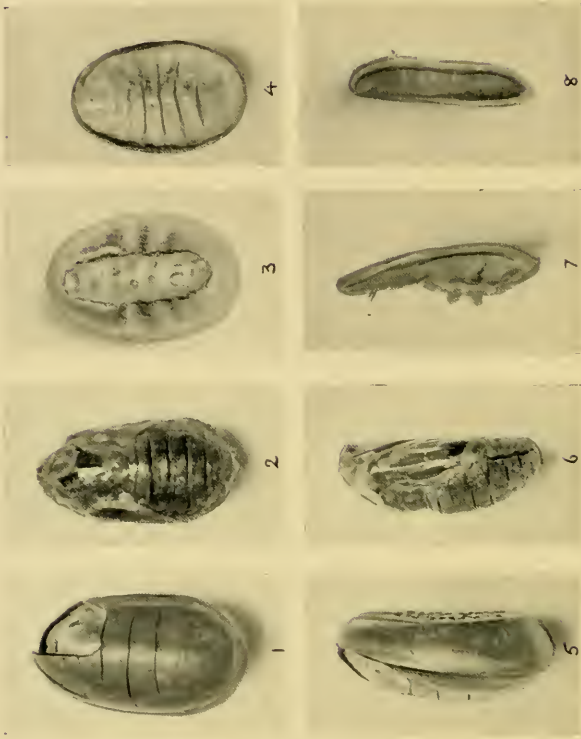
E. P. FELT. (a) "Elm Leaf Beetle in New York State," Ed. 2 57th Bull. New York State Mus., pp. 1-43; 8 Plates (1 coloured) and 2 text figures. Aug., 1902.—(β) "17th Rep. of the State Entomologist for 1901;" 53rd Bull. New York State Mus., pp. 699-925; 6 Plates and 29 text figures. Aug., 1902.

These two recent bulletins maintain the high repute of the publications of the New York State Entomologist. The 57th (No. 262 of the State University) being a revision of the 20th (June, 1898).

Although comparatively easy to control, the elm-leaf beetle (*Galerucella luteola*) is still the cause of extensive injuries to elms in cities and villages along the Hudson, and is regarded by Dr. Felt as the most important natural enemy of shade-trees in New York State. The causes for this condition of affairs are not hard to find, as the majority, if they notice the work of this pest at all, are inclined to trust in Providence and hope that its ravages will not be as severe the next season." The beetle is widely distributed over Europe, and is abundant and destructive in parts of Germany, France, Italy, and Austria. It is supposed to have been introduced into America about 1834, and its extension there now is from north of Massachusetts to North Carolina. It was noted in Albany about 1892, in 1897 most of the European elms in the streets were completely defoliated, and it is computed that fully 1000 elms were destroyed within the city limits in 1898. Dr. Felt cites cases even more lamentable in other towns. A coloured plate shows the metamorphoses, the other illustrations consisting of photographs of damage, spraying operations, and so forth. This bulletin should be as necessary to the restricted European worker as to the American.

The chief pest noticed in the 53rd Bulletin (No. 263 of the State University) is the Hessian Fly (*Cecidomyia destructor*), the rest of the report being taken up chiefly with a description of the Entomologic Exhibit, which must have been of exceptional interest, at the Pan-American Exhibition in 1901.

G. W. K.



W. J. Lucas } photo ad nat.
R. H. Carter }

West, Newman proc.

LIPHYRA BRASSOLIS, Westw.

Entom. xxxv. p. 153 & p. 225.

1. Larval shell showing pupa inside ; 2. Pupa extracted from larval shell ; 3. side view. 3. Larva, ventral surface ; 7, side view. 4. Larva, dorsal surface ; 8, side view, slightly oblique.

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LIFE-HISTORY OF *VANESSA ANTIOPA*.

By F. W. FROHAWK, M.B.O.U., F.E.S.

I AM deeply indebted to Mr. Frederic Raine for his kindness in procuring for me living examples of *V. antiopa*, which has enabled me to work out the life-history of this interesting species. On the 7th of April last I received from this gentleman eight females and three males, alive, which he captured at Hyères on the 5th; again, on the 7th, he caught two males and one female, and these he also sent me, arriving on the 9th. Five females of the first consignment I placed on two growing plants of willow, the same morning they reached me, but owing to the continuance of cold dull weather they remained quiet until the 13th, and on the 14th, with bright sunshine at midday, I had the pleasure of watching one of the females deposit a number of eggs, and made a sketch of her in the act. She clung to a small stem, and deposited 192 eggs in one batch, which encircled the stem; while depositing the end of the abdomen curves from side to side of the branch; the ovipositor, feeling for the last egg laid, carefully places another beside it, in circles round the stem, working upwards, until the batch is completed. On this day another batch was deposited by another female, and others on the following days; so that by the 25th eight batches were laid. These five females continued depositing at intervals for several weeks, and the last eggs were laid in small batches on June 27th.

On May 21st four batches were laid, consisting of about 450 eggs, the smallest batch containing 53, and the largest about 160. On May 27th another lot of eggs deposited in four batches, the smallest batch of 3 doz. and the largest 170—in all 336. All five females still alive on May 25th. The first one died on the 26th; the other four were quite lively, and had a big drink each after

depositing the 336 eggs. Another female died on June 4th ; the third one died on June 22nd. On June 27th 100 more eggs were deposited in batches ; these were the last eggs laid. The following day another female died, and on June 30th the last one succumbed, having lived in my possession exactly three months (eighty-four days).

From the above it will be seen that this species deposits its eggs in two or three or even more batches, averaging from about 150 to 250 eggs in a batch. When a stout stem is selected for the eggs, the batch does not encircle it, but only covers that portion (generally about half the circumference, and always on the under side) which the abdomen can cover with the ovipositor. These five females laid over 2000 eggs—as well as I could count them, I found there were about 2200 ; therefore the complement of eggs laid by *antiopa* numbers between 400 and 500. When resting these butterflies usually clustered together at the top of the gauze covering the plant.

The egg measures $\frac{1}{28}$ in. high, of an oblong form, and having, as a rule, eight, but occasionally nine, longitudinal keels, commencing below the summit, and rising prominently ; they then gradually decrease in height, and disappear before reaching the base ; they are fluted, and resemble white frosted glass ; the spaces between the keels are slightly concaved, and very finely fluted transversely, the ridges being extremely fine. The micropyle is slightly raised in the centre, and is finely granulated ; near the base the surface is faintly ridged longitudinally ; the base is firmly embedded in glutinous substance. The colour when first laid is a rather deep ochreous yellow, inclining to olive-yellow, which very gradually deepens to an olive-brown to the naked eye ; but when viewed under the microscope the whole surface presents a finely mottled appearance, resembling in pattern crocodile-skin, the ground colour being amber-brown, with light amber-yellow reticulations ; this pattern is under the shell. When about fourteen days old one batch of eggs had changed to a deep lilac-red, approaching indian-red, and on the eighteenth day had assumed a deep leaden grey, and hatched on the 21st. Other batches did not attain such a deep red colour, the normal change of colouring being from a deep ochreous-yellow and olive-brown to a deep red-brown ; then the larva begins to show under the shell, exhibiting a pale ochreous body and dark brown head, which gradually turns to black ; the shell is then of a glistening pearl-grey. To the naked eye the entire batch appears of a beautiful silver-grey-blue just before hatching. The larva begins making its exit by nibbling tiny holes in a circle round the crown of the egg ; this continues until it is completely cut round ; then it pushes off the cap and emerges. It immediately starts spinning a carpet of silk as it crawls away, spinning as it goes, crawling to the extremity of the branch.

They all do precisely the same, and at once form a colony on the last cluster of leaves, covering the bases with web, on which they live and feed in company.

The first batch hatched on May 3rd, remaining in the egg state nineteen days; this batch contained 192 eggs, all of which hatched, excepting one. On May 5th another batch hatched, and all did the same as the first lot; and on the 16th a very large batch hatched, the eggs being on the same branch as those which hatched on the 5th; and directly the larvæ emerged they all started spinning and crawling up the branch till they arrived at the part already covered with web by the previous brood, and, following the web-covered branches, every individual of the large batch ascended and joined the elder company, which were eleven days old; the two families then formed one big community, the ones just hatched nestling among their larger companions. On the 17th of May another big batch emerged, which divided into two companies.

The larva, directly after emergence, measures $\frac{1}{6}$ in. long; the head is large and shining black, and a few fine black bristles are scattered over the surface; the segmental divisions are clearly defined, each segment having about four transverse wrinkles and ten black hairs (five on each side); those on the dorsal surface are very long, slightly curved, and three in number above the spiracle; immediately behind the spiracle is another, which projects laterally; and slightly in front and below the spiracle is the fifth, which curves downwards; all these are black, with shining black bulbous bases; the surrounding skin is bare of the minute black granulations which cover the whole of the surface of the body; these bare places form a pale circular disk round each hair, and also the spiracles, which are black; the claspers are granulated with black at the base, and have two whitish spines directed downwards; the foot is large, and furnished with very ample claws. The entire colouring of the body is pale olive-yellow, inclining to citron.

The larvæ always rest in a dense mass, all crowded together, some on top of the others; they cover the leaves with web. As soon as the leaves are stripped of the cuticle the entire company move to a fresh supply. If disturbed they curve upward the anterior portion of the body, and remain in that attitude for a short time. When the whole company are slightly on the move in the sun, they form a curious sparkling mass, due to the immense number of glistening black heads.

Shortly before the first moult the larva measures $\frac{3}{14}$ in. long; it is uniformly cylindrical, the segments deeply incised and very glossy. The ground colour is amber-brown, with a medio-dorsal series of longitudinal dark brown marks, and mottlings of the same colour form a dark spiracular band; the spiracles are also amber-brown; the sub-dorsal surface is freckled with brown.

When undergoing the change for moulting they occasionally move about on the web-covered leaves, a habit unusual among other species of butterflies.

The first moult occurred on May 20th. Directly after moulting the head is ochreous, but in a very short time turns jet-black and shining; also there are ochreous dorsal markings, which soon change to dull brown.

Before the second moult, when twenty-three days old, it measures $\frac{2}{5}$ in. long; the body is covered with minute black points, being so small that they give the glossy surface a granular appearance; besides these, tiny black warts are sprinkled over the whole surface; these vary in size, and each emits a tiny black hair; there are also longitudinal rows of small black tubercles; the first is medio-dorsal, the second sub-dorsal, the third super-spiracular, and the fourth sub-spiracular; these all terminate in a rather long, slender, curving, black bristle, and several shorter ones spring from the sides of each tubercle; the spiracles are black; the ground colour is brown freckled with ochreous, and a broad band of the latter colour extends dorsally, which is broken up by a medio-dorsal series of dark markings as in the previous stage; the head is shining black and beset with hairs; legs shining black; the claspers are clear ochre-yellow, the same colour as the dorsal band. The larvæ feed upon the topmost leaves, at first eating the basal portion of them, which hang down by the weight of the larvæ, the ends resting on the next lot of leaves, and feeding on these in turn, and so on, working their way downwards, feeding as they go, eating all the leaves, and covering everything with web.

Second moult on May 27th. Before the third moult—twenty-nine days old—it measures $\frac{7}{10}$ in. long. The ground colour is a deep ashy or purplish black; the dorsal band orange, broken up with black markings as in former stage; immediately below the spiracles are very faint crescentic markings, almost invisible; the tubercles of the previous stage are now developed into moderately long black spine-like tubercles, each terminating in a longish curved white bristle, and numerous much smaller lateral hairs, and all the minute body-warts bear white hairs instead of black as in the last skin; the head and legs are shining black, with fine white hairs; the claspers are amber colour. The medio-dorsal series of spines are very short, and commence on the sixth segment and end on the eleventh, one on each of these six segments. They still remain gregarious. When one branch is denuded of leaves, they all descend until reaching another branch, which they ascend to the end, and, again clustering together in a mass, feed downwards as before; when moving they are extremely active, and feed rapidly. Warm weather greatly influences the rapidity of their growth, cold retarding them considerably.

Third moult on June 2nd. Before the fourth moult—thirty-four days old—it measures $1\frac{1}{4}$ in. long; the ground colour is velvety black, otherwise very similar to previous stage, but the dorsal orange band is richer and deeper in colour, and there are numerous very small pearly-white warts sprinkled over the body (mostly forming circles round each segment on the two posterior wrinkles); these, as well as the minute black warts, emit fine curved white hairs; the black spines also bear fine white hairs; the dorsal spines terminate with black spine-like bristles; the super- and sub-spiracular spines end with longish curved white hairs with black tips; the black head is bilobed and cleft on the crown, and covered with white hairs; legs shining black; claspers bright tawny, excepting the anal pair, which are black; on the eleventh segment is a small medio-dorsal shining black disk, and on the twelfth segment is a much larger one, which closely resembles the head. They still live in close company.

(To be continued.)

GONEPTERYX RHAMNI AND CLEOPATRA IN IRELAND.

By E. BAGWELL-PUREFOY.

IN the December number of the 'Entomologist' for the year 1896 (xxix. 363), I reported the successful introduction of *Gonepteryx rhamni* into the County Tipperary. A few further notes on the subject may possibly prove of interest. To recapitulate as briefly as possible:—In 1890, and again in 1894, a number of plants of *Rhamnus frangula*, and a few of *R. catharticus* were planted about over grounds which may be roughly estimated at five hundred acres. In the autumn of the latter year, between two and three hundred imagines of *G. rhamni* were turned out in the most suitable spots of the same grounds. The result, as observed in 1896, was of a most gratifying nature; the butterflies had "caught on," and had enormously increased in numbers.

During the five succeeding years I was continuously abroad, and plants and insects alike were left strictly to take care of themselves. Returning home once more in the autumn of 1901, I visited the South of Ireland about the middle of September, and found that the plants, on the whole, had done well, many of the *R. frangula* having grown into fine big trees; some of the *R. catharticus*, too, had not only survived, but had developed into strong plants. The first bit of sunshine revealed the fact that *G. rhamni*, also, was still flourishing, and, during a fortnight of fair weather, I counted a goodly number on the wing.

Early in November I planted out one hundred small trees of *R. frangula* around the borders of the place, and, at the same

time, I placed about in the shrubberies a few each of some eight different foreign species of *Rhamnus*. The unfavourable spring of this year kept me from paying the district a visit before June 24th, and this date proved quite early enough. The number of ova and small larvæ which I observed was quite astonishing. From off the newly planted *R. frangula* I took over three hundred and fifty larvæ; half of these I placed on older trees better able to support them, and the other half I brought in to rear myself, but of these more anon. I may mention here that it is not the healthiest trees with abundance of foliage that receive the best patronage, but rather the weaklings—sometimes, indeed, those that are just dying off—and many larvæ must perish every year through this peculiar *penchant* of their mothers.

The “foreigners” had all been planted in pet, sunny spots, and were growing well. Five out of the eight species received attention from *G. rhamni*, and four out of the five produced fine-sized larvæ in due course. The following are the plants in question:—*R. latifolius*, *R. tinctorius*, *R. purshianus*, *R. imeritinus*, and *R. alpinus*. A considerable number of eggs were laid on the last-named plant, but the little larvæ did very badly on it. Of six that I brought in, I only succeeded in obtaining one pupa. This pupa was considerably less than half the normal size, and failed to produce an imago. *Latifolius* was the only evergreen species which was noticed, and it produced the largest larvæ I have seen.

On June 16th I received twelve dozen pupæ of *Gonepteryx cleopatra*, which Mr. H. W. Head, of Scarborough, had procured for me from South Austria. Some of the insects began to emerge before I was able to get over to Ireland on the 24th, but these were kept snug in a big tin box with wet grass, and in no way suffered. The last imago appeared on July 1st, and, all told, I had been able to liberate about one hundred healthy insects. The place is peculiarly suited to an experiment of this kind, the young plantations being intersected by broad rides, sheltered from the wind and open to the sun, with an abundance of wild flowers, and, lastly, a total absence for miles around of the man with the net and collecting box. *Cleopatra* quickly settled down to her changed surroundings, and very comely she looked floating about in the sun—a sun which failed not during the first few days of her liberation. Bramble blossoms proved the chief attraction at first, and later on thistle-heads, scabious, knapweed, and other composites.

I had found it very hard to obtain any information about this insect, and was working under the impression that it was single-brooded, after the manner of our native *G. rhamni*. I was, however, quickly undeceived. Pairing commenced at once, and on July 13th I observed a female depositing ova on a big

tree of *R. frangula*. The male insects are the most ardent suitors imaginable, and I have many times watched one for over half an hour persisting in a courtship which was evidently not welcome. In this particular case the female had laid several eggs on the tree, and was proceeding down the ride to another bush, when she was seized upon by a male, and the usual struggle for supremacy began. I watched them for many minutes, till they finally disappeared over the tops of the larch trees. (I have since had access to certain German works on European butterflies at the Natural History Museum, South Kensington, and find that the fact that this variety is double-brooded is well known.) From the middle of July onwards the work of ovipositing was busily proceeded with, *R. frangula* receiving nearly all the attention, *R. catharticus*, however, being noticed occasionally.

Up to this point all had gone smoothly, but, alas! this was not to continue: the little larvæ, on emerging from their eggs, did not look upon *R. frangula* as food fit to be eaten. Some, indeed, nibbled a little, and kept themselves alive for three or four days, and then disappeared, but the large majority passed away at once, and were no more seen. Better luck, however, attended those few which found themselves born into the world on *R. catharticus*. Provided they had been laid on, or had access to, the tender, only half-unfolded leaves of a young shoot, their fate was never in doubt. They crawled into one of these half-closed leaves and remained there until after the first moult, or perhaps longer. For the first half of their larval career they ate nothing but the very youngest leaves, and even when nearly full-grown would refuse foliage which was in the least degree old or tough. Thus I was confronted by the annoying spectacle of the mother butterfly almost invariably choosing the useless food-plant whereon to place her eggs, and passing by the one really suitable for her purpose. On several occasions I have seen a female, after hovering all round a bush of *catharticus*, refuse it, and proceed at once to a neighbouring *frangula* and lay on it. The full-grown larva of *cleopatra* is generally slightly superior in size to that of *ramni*, and exhibits a bluish hue over the dorsal surface, the white lateral lines being remarkably clear. The pupal stage, I found, lasted twenty-five days, sometimes a little longer, and for eight to ten days previous to emergence the orange colour on the fore wings of the males showed through the wing-cases as a broad patch of colour. The previous autumn I had planted out three or four small plants of *R. alaternus* var. *angustifolius*, and I placed several newly-hatched larvæ on sprigs of this plant, but they would not touch it. This I am quite unable to explain, *alaternus* being the natural food-plant of *cleopatra* in Southern Europe.

As soon as I had quite convinced myself that *R. frangula*

could not rear them, I proceeded to collect all the eggs I could find on that plant, and transfer them to *R. catharticus*, by the simple expedient of pinning the portion of leaf wheron they had been deposited to the most suitable situation on the new shrub. In this manner I procured a large number of larvæ, the food-plant evidently suiting them admirably, as comparatively few failed to grow and wax strong.

On August 4th, a bright, sunny day after several dull ones, I placed a box containing a number of my home-reared *G. rhamni* beneath a clump of brambles and left it open, so that the insects could fly as soon as they felt inclined to. Returning to the spot a couple of hours later, I was surprised to see no less than four males of *cleopatra* hovering over the brambles, but on drawing quietly near their presence was soon explained to me. Beneath each *cleopatra* was the quivering form of a female *rhamni*, with abdomen pointing upwards and wings half open and flattened out in a most unnatural position. The unexpected and unwelcome suitors were most persistent in their court, and by sheer rough treatment one after the other succeeded in forcing the object of its attentions to take to wing, when the pair would soar high in the air and then return low down among the herbage, the female doing her utmost to escape. Later on in the month the wild chase of *rhamni* by *cleopatra* was a matter of common occurrence, though whether any results were obtained is more than doubtful.

At the end of August I had to return to England, and it was necessary to abandon my caterpillars to their own devices. I, however, took with me half a dozen pupæ* (just turned), and about fifty larvæ of *cleopatra*, which were all doing well. On the *R. catharticus* of the hedgerows of Bucks I found no succulent young leaves to offer them, and the want of these made itself apparent at once. Many turned prematurely, and many died. How those that I left behind have fared I know not, but their parents were still on the wing, healthy and strong, up to the end of August, and I am of opinion that they will so have continued through September.

NEW SPECIES OF INDIAN CHRYSIDIDÆ.

BY MAJOR C. G. NURSE, Indian Staff Corps.

THE species described in the following paper form part of a collection of Hymenoptera made by me during the past two years at Deesa in Northern Gujarat, Quetta in Baluchistan, and during a two months' trip to Kashmir in 1901.

* Two of these pupæ kindly sent to me by Mr. Purefoy produced fine specimens of *cleopatra* in September last.—R. S.

NOTOZUS KASHMIRENSIS, n. sp.

♀ ♂. Front from above base of antennæ to about half-way to vertex concave and finely striate, the striæ running in a circular direction, with the base of antennæ as centre; remainder of head and thorax somewhat coarsely punctured, except the extreme base of mesonotum, which is finely punctured; abdomen very finely and minutely punctured; inner orbits parallel; mucro conspicuous and very coarsely punctured, rounded at apex; abdomen about the length of the head and thorax united, very convex above, gradually rounded towards the extreme apex, which is transverse or slightly emarginate. Deep metallic blue or blue-green, the antennæ and tarsi rufo-testaceous; wings hyaline at base, the outer half infuscated, tegulæ shining bronzy brown; abdomen and legs covered with a very sparse and short greyish pubescence, only perceptible with a strong lens; the antennæ, when examined under a microscope, are closely punctured and densely hairy. Long. 4-5 mm.

Hab. Kashmir, 5000 ft., on the banks of the Jhelum; several specimens.

This genus has not been previously recorded from India.

ELLAMPUS TIMIDUS, n. sp.

♀. Head, pronotum, and mesonotum shallowly and somewhat irregularly, scutellum, postscutellum, and median segment more coarsely and closely punctured, abdomen impunctate; the incision at the apex of abdomen, characteristic of the genus, small and inconspicuous. Deep metallic blue; antennæ piceous, microscopically hairy; tarsi testaceous; clypeus with a few long hairs, legs with greyish pubescence, head, thorax, and abdomen almost entirely smooth; wings hyaline, nervures testaceous, tegulæ brownish testaceous.

♂. Similar; more conspicuously shining; vertex of head, pronotum, and mesonotum above almost, if not quite, impunctate. Long. 2.5-3 mm.

Hab. Quetta; Peshin; five specimens.

This species has not previously been recorded from India.

HOLOPYGA CUPREATA, n. sp.

♂. Front from below vertex to base of antennæ very concave, and finely transversely striate, head behind ocelli somewhat finely punctured; remainder of head, thorax, and median segment coarsely, abdomen closely and finely punctured; head slightly wider than pronotum, abdomen slightly longer and broader than thorax; a little short, sparse pubescence, visible only with a lens, on the head, legs, and abdomen; a trace of a median longitudinal carina on 2nd abdominal segment. Head and thorax dark blue, the vertex, pronotum, and mesonotum with a greenish tinge; abdomen brilliant coppery golden, scape of antennæ dark blue, flagellum and tarsi very dark testaceous, almost black; wings hyaline at base, the outer half tinged with fuscous, tegulæ black. Long. 5-6 mm.

Hab. Kashmir, 5000-6000 ft.; two specimens.

HEDYCHRIDIMUM PERVERSUM, n. sp.

♀ ♂. Vertex of head, and thorax, closely, but not very finely, abdomen minutely and regularly punctured—all the punctures somewhat shallow; front concave, with stiff, white pubescence, which hides the sculpturing; pronotum smaller than the head, its sides almost parallel; posterior angles of median segment acute and conspicuous; abdomen wider than head and thorax. Metallic green, with some bluish reflections, especially about the joints of the segments and near the tegulæ; abdomen with a slight coppery effulgence; flagellum of antennæ dark rufous; the whole of the head, thorax, abdomen, and legs covered with very short greyish pubescence; wings hyaline and iridescent, nervures testaceous, tegulæ metallic blue or blue-green. Long. 2.5–3 mm.

Hab. Peshin; Quetta; five specimens.

The smallest species hitherto described from India.

HEDYCHRIDIMUM SELECTUM, n. sp.

♂. Head and thorax closely and finely, postscutellum more coarsely, abdomen minutely and closely punctured; pronotum and head subequal, the former with its sides almost parallel; abdomen wider than thorax, very convex, 3rd segment almost vertical. Dark blue; 2nd abdominal segment with purple reflections; antennæ dark rufous, tarsi testaceous; wings hyaline, their apical margins very slightly darker, nervures and tegulæ testaceous; a little sparse, short, greyish pubescence on head, thorax, abdomen, and legs. Long. 3.5 mm.

Hab. Quetta; a single specimen.

This species is easily distinguished from *H. perversum* above by its being dark blue, and not light green, and by its longer pronotum. The basal nervure is also more sharply curved in the present species than in *H. perversum*.

CHRYISIS JALALA, n. sp.

♀. Slenderly built; head, except front, thorax, and abdomen, closely but not very finely punctured, and very sparsely covered with short greyish pubescence; clypeus emarginate anteriorly, front concave from below a transverse ridge which is situated just below the vertex, covered with a somewhat sparse white pubescence, and finely transversely striate in the centre; head, thorax, and first two abdominal segments of about equal width; head, when viewed from above, equal in size to pronotum; scutellum and postscutellum somewhat more coarsely punctured than the rest of the segments; abdomen as long as the head and thorax united, the 2nd segment with a median longitudinal carina, 3rd segment rounded at apex, with a conspicuous subapical row of foveæ. Dark blue, the clypeus bright green, the pronotum, mesonotum, scutellum and postscutellum, and a spot on the 3rd abdominal segment just above the subapical row of foveæ, green; the first abdominal segment, except the extreme base and a line on the centre above not reaching the apex, and the apical two-thirds of the 2nd abdominal segment bright coppery golden; second and following joints of flagellum of antennæ dark red; tarsi dark

testaceous, almost black; remainder of legs metallic green; wings hyaline, tegulæ dark blue, radial cell closed.

♂. Similar; the patch of blue on the 2nd abdominal segment not transverse, but somewhat wedge-shaped; no green spot on 3rd abdominal segment; antennæ light red below, except the first two joints, which are metallic green. Long. 6.5–9 mm.

Hab. Kashmir, 5000–6000 ft.; three specimens.

CHRYSIS KASHMIRENSIS, n. sp.

♀ ♂. Head closely and regularly, thorax somewhat coarsely punctured and rugose, abdomen with the first segment coarsely punctured, but not rugose, 2nd and 3rd segments finely punctured, especially at base of 2nd segment; the whole insect sparsely pubescent; clypeus slightly emarginate, and with a median carina; front not forming an angle with the vertex, and the puncturing little, if any, finer than on the remainder of head; head, when viewed from above, considerably larger than pronotum; abdomen nearly as long as head and thorax united; pronotum with a slight median depression; a hollow at the base of postscutellum; the 1st and 2nd abdominal segments with an ill-defined median carina; 3rd segment rounded, with subapical foveæ. Dark blue or blue-green; base of mandibles, clypeus and front, scape and first two joints of flagellum of antennæ, and the legs, except the tarsi, light metallic green; mandibles, remainder of flagellum of antennæ, and the tarsi, reddish black; abdomen below light metallic green, the base of the apical segment and two large basal maculæ on 2nd segment, reddish brown; wings hyaline, apex of fore wing with a very slight fuscous tinge, which is sometimes confined to the radial cell; tegulæ dark blue, finely punctured; radial cell of fore wing closed. Long. 9–10 mm.

Hab. Kashmir, 5000–6000 ft.; five specimens.

CHRYSIS QUÆRITA, n. sp.

♂. Rather stontly built; head, thorax, and abdomen closely, but not very finely, punctured, and covered with a short, sparse, greyish pubescence; head about as wide as pronotum and, when viewed from above, subequal to it; abdomen not quite so long as head and thorax united, vertex overhanging the front, but with no distinct ridge between them; front concave, closely and finely punctured, and with stiff, somewhat sparse, white pubescence; pronotum with a median longitudinal depression; 3rd abdominal segment tri-sinuate, with subapical foveæ. Dark blue, with a greenish tint in some lights; front and scutellum light green; mandibles, antennæ, and tarsi black; wings hyaline, the radial cell subfuscous and closed. Long. 6 mm.

Hab. Deesa; a single example.

CHRYSIS ABUENSIS, n. sp.

♀. Head and thorax finely and rugosely, abdomen finely and closely punctured; a little short greyish pubescence on the cheeks and on 2nd and 3rd abdominal segments; front, basal half of antennæ, and legs with short white pubescence; head at least as wide as pronotum, and, viewed from above, about equal to it; abdomen about the

length of head and thorax united; clypeus convex, its anterior margin slightly concave; a conspicuous { -shaped carina in front of anterior ocellus, and the front below it slightly concave, finely and very closely punctured, the punctures running into striæ, and with a median longitudinal carina; a median longitudinal depression on the basal half of pronotum; 1st and 2nd abdominal segments with a trace of a median longitudinal carina, 3rd segment rounded posteriorly, with subapical foveæ. Dark blue; front, pronotum, and the centre of 1st abdominal segment green; scutellum and large lateral spots on 1st abdominal segment coppery golden; postscutellum bright greenish golden; scape and first two joints of flagellum of antennæ blue or blue-green, remaining joints and tarsi reddish black; fore wing subfuscous, hind wing hyaline, radial cell of fore wing closed.

♂. Differs only in having the vertex of the head green, and the mesonotum, and 2nd and 3rd abdominal segments of a greenish blue colour; the eyes are somewhat convergent below, not parallel, as in the female, and the joints of the antennæ are thicker and somewhat shorter. Long. 9–11 mm.

Hab. Mt. Abu; common in September and October.

CHRYYSIS CHAVANÆ, n. sp.

♀. Head and thorax closely but somewhat irregularly, abdomen rather more regularly and finely punctured; head wider than pronotum, the latter with sides almost parallel; 1st abdominal segment with a deep median longitudinal indentation at base, 2nd and 3rd segments with traces of a carina, apical segment without teeth, slightly sinuate. Head and thorax dark blue, the mesonotum with greenish reflections; abdomen light metallic green, with a coppery effulgence on 2nd and 3rd segments; legs dark blue; flagellum of antennæ piceous; tarsi dark red or reddish black; the whole insect more or less covered with rather sparse greyish pubescence; wings hyaline, fore wing with the central portion very slightly infuscated, nervures dark testaceous. Long. 6 mm.

Hab. Quetta; a single specimen.

(To be continued.)

ON THE BUTTERFLIES COLLECTED IN EQUATORIAL AFRICA BY CAPTAIN CLEMENT SYKES.

By EMILY MARY SHARPE.

(Continued from p. 280.)

35. *ACRÆA CÆCILIA* (a variety).—*a*, ♂. March from Usoga to Nandi; April, 1900.

This species has the black spots on the primaries larger, especially those at the end of the discoidal cell. The same thing occurs with the discal spots on the secondaries, the first three being black streaks; with the costal one united to the hind marginal border.

36. *A. PERENNA*, *Doubl. & Hewits.*—*a, b*, ♂. March from Usoga to Nandi; April, 1900.
37. *A. PHARSALUS*, *Ward.*—*a, b*, ♂. March from Usoga to Nandi; April, 1900.
38. *A. ZETES* (*Linn.*).—*a-c*, ♂ ♀. March from Usoga to Nandi; April, 1900.
39. *A. ASTRIGERA*, *Butl.*—*a, b*, ♂ ♀. Wadelai; January–March, 1900.
40. *A. EGINA* (*Cram.*).—*a*, ♂. March from Usoga to Nandi; April, 1900.
41. *A. LYCIA* (*Fabr.*).—*a*. Lamogi; November, 1899. *b, c*. March from Usoga to Nandi; April, 1900.
42. *PLANEMA ARCTIFASCIA*, *Butl.*—*a*. March from Usoga to Nandi; April, 1900.
43. *PARDOPSIS PUNCTATISSIMA*, *Boisd.*—*a, b*. Wadelai; January–March, 1900. *c*. March from Usoga to Nandi; April, 1900.

Family NYMPHALIDÆ.

44. *ATELLA PHALANTHA* (*Drury*).—*a, b*. March from Usoga to Nandi; April, 1900.
45. *A. COLUMBIA* (*Cram.*).—*a, b*. March from Usoga to Nandi; April, 1900.
46. *PYRAMEIS CARDUI* (*Linn.*).—*a*. March from Usoga to Nandi; April, 1900. *b*. Unyoro; March, 1900.
47. *ARGYNNIS HANNINGTONI*, *Elwes.*—*a, b*. March from Usoga to Nandi; April, 1900.
48. *VANESSULA MILCA*, *Hewits.*—*a*. March from Usoga to Nandi; April, 1900.
49. *HYPANARTIA* ? *DELIUS* (*Drury*).—*a*. March from Usoga to Nandi; April, 1900.

This specimen represents a melanistic phase, as the upper surface is entirely brownish black, the characteristic chestnut band on the primaries being obsolete, but distinctly indicated on the under surface, as are all the other spots and markings.

50. *H. HIPPOMENE*, *Hubn.*—*a*. March from Usoga to Nandi; April, 1900.
51. *JUNONIA CLELIA* (*Cram.*).—*a, b*, ♂ ♀. Wadelai; January–March, 1900. *c*. ♀. Lamogi; November, 1899.
52. *J. CEBRENE*, *Trim.*—*a, b*. March from Usoga to Nandi; April, 1900. *c*. Unyoro; March, 1900.
53. *J. BOÖPIS*, *Trim.*—*a*, ♀. Wadelai; January–March, 1900. *b, ♂*. March from Usoga to Nandi; April, 1900.
54. *J. WESTERMANNI*, *Westw.*—*a, b*, ♂ ♀. March from Usoga to Nandi; April, 1900. *c*, ♂. Unyoro; March, 1900.

55. *PRECIS SESAMUS*, *Trim.* — *a, b.* March from Usoga to Nandi; April, 1900.
56. *P. CALESCENS* (*Butl.*). — *a, b.* March from Usoga to Nandi; April, 1900.
57. *P. CÆLESTINA*, *Dewitz.* — *a.* March from Usoga to Nandi; April, 1900.
58. *P. ARCHESIA* (*Cram.*). — *a, b.* March from Usoga to Nandi; April, 1900.
59. *P. CERYNE* (*Boisd.*). — *a, b.* Wadelai; January–March, 1900. *c.* Unyoro; March, 1900.
60. *P. GALAMI* (*Boisd.*). — *a.* Unyoro; March, 1900. *b.* March from Usoga to Nandi; April, 1900.
61. *P. PELARGA* (*Fabr.*). — *a.* Wadelai; January–March, 1900. *b.* Unyoro; March, 1900.
62. *P. INFACATA* (*Butl.*). — *a.* Wadelai; January–March, 1900. *b.* March from Usoga to Nandi; April, 1900.
63. *P. TEREÀ* (*Drury*). — *a.* March from Usoga to Nandi; April, 1900. *b.* Unyoro; March, 1900.
64. *P. ORTHOSIA* (*Klug*). — *a.* Wadelai; January–March, 1900. *b, c.* March from Usoga to Nandi; April, 1900.
65. *P. GREGORII* (*Butl.*). — *a–c.* March from Usoga to Nandi; April, 1900.
66. *CATACHROPTERA CLOANTHA* (*Cram.*). — *a, b.* March from Usoga to Nandi; April, 1900.
67. *PSEUDARGYNNIS HEGEMONE* (*Godt.*). — *a.* March from Usoga to Nandi; April, 1900.
68. *EURYTELA DRYOPE* (*Cram.*). — *a, b.* March from Usoga to Nandi; April, 1900.
69. *E. OPHIONE* (*Cram.*). — *a.* Unyoro; March, 1900.
70. *ERGOLIS ENOTREA* (*Cram.*). — *a–d, ♂ ♀.* March from Usoga to Nandi; April, 1900.
71. *BYBLIA ILITHYIA* (*Drury*). — *a.* Lamogi; November, 1899.
72. *CRENIS OCCIDENTALIMUM*, *Mabille.* — *a, b.* March from Usoga to Nandi; April, 1900.
73. *C. NATALENSIS*, *Boisd.* — *a, b.* — March from Usoga to Nandi; April, 1900.
74. *NEPTIS MAPESSA*, *Hopff.* — *a.* Unyoro; March, 1900.
75. *N. AGATHA* (*Cram.*). — *a, b.* March from Usoga to Nandi; April, 1900.
76. *PANOPEA LUCRETIA* (*Cram.*). — *a.* March from Usoga to Nandi; April, 1900.
77. *HAMANUMIDA DÆDALUS* (*Fabr.*). — *a, b.* Wadelai; January–March, 1900. *c, d.* March from Usoga to Nandi; April, 1900.
78. *HYPOLIMNAS MISIPPUS* (*Linn.*). — *a, b, ♂.* Unyoro; March, 1900. *c, ♀.* March from Usoga to Nandi; April, 1900.

79. *H. ANTHEDON*, *Doubl.*—*a*, ♂. March from Usoga to Nandi; April, 1900.

80. *H. MONTEIRONIS* (*Druce*).—*a*, ♀. March from Usoga to Nandi; April, 1900.

81. *SALAMIS ANACARDII* (*Linn.*).—*a*. March from Usoga to Nandi; April, 1900.

82. *S. CACTA* (*Fabr.*).—*a*, ♂. March from Usoga to Nandi; April, 1900.

83. *S. TEMORA*, *Feld.*—*a*. March from Usoga to Nandi; April, 1900.

84. *EURYPHENE THEOGNIS*, *Hewits.*—*a*, *b*, ♂ ♀. March from Usoga to Nandi; April, 1900.

85. *EUPHEDRA UGANDA*, *Auriv.*—*a*. March from Usoga to Nandi; April, 1900.

86. *CYMOTHOE LURIDA* (*Butl.*).—*a*, ♂. March from Usoga to Nandi; April, 1900.

87. *EUXANTHE CROSSLEYI* (*Ward*).—*a*, ♂. March from Usoga to Nandi; April, 1900.

88. *E. ANSELLICA* (*Butl.*).—*a*, ♂. March from Usoga to Nandi; April, 1900.

89. *CHARAXES CASTOR* (*Cram.*).—*a*, *b*. March from Usoga to Nandi; April, 1900.

90. *C. LICHAS* (*Doubl. & Hewits.*).—*a*. March from Usoga to Nandi; April, 1900.

91. *C. NUMENES* (*Hewits.*).—*a*, *b*, ♂ ♀. March from Usoga to Nandi; April, 1900.

92. *C. TIRIDATES* (*Cram.*).—*a*, *b*, ♂. March from Usoga to Nandi; April, 1900.

93. *C. KIRKII*, *Butl.*—*a*, *b*, ♂. March from Usoga to Nandi; April, 1900.

94. *C. ETHEOCLES* (*Cram.*).—*a*, *b*, ♂. March from Usoga to Nandi; April, 1900.

95. *C. ETESIPE* (*Godt.*).—*a*, ♀. March from Usoga to Nandi; April, 1900.

96. *C. EPIJASIVS*, *Reiche.*—*a*, *b*, ♂. Wadelai; January–March, 1900.

97. *C. POLLUX* (*Cram.*).—*a*. March from Usoga to Nandi; April, 1900.

98. *C. VARANES* (*Cram.*).—*a*, *b*. March from Usoga to Nandi; April, 1900.

(To be continued.)

ON SOME NEW GENERA AND SPECIES OF HYMENOPTERA (ICHNEUMONIDÆ, CHRYSIDIDÆ, FOSSORES, AND APIDÆ).

BY P. CAMERON.

(Continued from p. 264.)

AMPULEX BREVICORNIS, sp. nov.*

Cæruleo-viridis; antennis tarsisque nigris; femoribus posterioribus rufis; alis fusco-violaceis. ♀. Long. 23-24 mm.

Hab. Khasia (coll. Rothney).

Antennæ short, stout, about twice the length of the head; black, opaque; the third and fourth joints equal in length; the fourth to sixth joints incised at the base beneath. Head shining, smooth, except for a few large deep punctures above each antenna; each puncture bears a long hair. Eyes converging slightly above, the width separating them being about the length of the basal three joints of the antennæ united. The apex of the clypeus is largely depressed, the depression becoming gradually wider towards the apex, which is not toothed; backwards the keel extends to the base of the antennæ. Antennal tubercles stout; there is no keel over the antennæ; behind the head is developed to a greater length than the length of the eyes. The apical part of the prothorax is broader than long, the sides almost straight; its basal half bearing large deep distinctly separated punctures, and with a narrow distinct longitudinal furrow. The basal half of the mesonotum, except in the middle, bears large deep clearly separated punctures, and is covered with long black hairs; the middle has a distinct furrow, extending from the base to near the apex. The scutellum has a row of punctures round the sides and apex, as has also the post-scutellum. There is no central keel on the median segment, except at the extreme base; the inner lateral lines form a large triangle, which is distinctly striated; the basal striæ are slightly oblique, and arise from the centre; the apical ones go right across; at the apex the keels are waved and reach to the apex. The apex has an almost perpendicular slope, is smooth at the base, the rest with curved striations, which are finer on the inner side. The propleuræ smooth; the middle under the keel striated at the apex. Mesopleuræ smooth, the upper and apical parts striated; the lower middle part more finely and closely striated. Mesosternum smooth, sparsely pilose; the furrow keeled in the middle. The mesonotum at the base and sides and the greater part of the median segment are more or less indigo-blue. There is no distinct tooth on the apex of the median segment, only the second keel on the metapleuræ projects slightly. The anterior femora blue; the

* This species has the basal ventral segments formed as with *Ampulex assimilis*, Kohl, from Guinea, and figured by him (Annal. d. k.k. Natur. hist. Hof. Mus. Wien, viii. pl. xii. f. 38), and not as in *A. cognata*, fig. 34, *i.e.* the lower side is roundly curved and incised at the apex, somewhat as in *A. latifrons*, but not roundly dilated at the apex as in that species (*cf.* Kohl, *l.c.* f. 43). The apical half, too, of the clypeus is cleft, not the apical third, as in *cognata*.

tibiæ and tarsi blackish; the apex of the tibiæ rufous. The four hinder femora are red, blackish at the extreme apex; the trochanters, tibiæ, and tarsi black; the end joint of the tarsi with a heart-shaped dilatation, which reaches to the middle of the joints; the claws bifid. Wings fuscous-violaceous; the appendicular cellule is open; the apex of the radial nervure is united to the nervure bordering the radial cellule, not received in front of it as in *A. latifrons*; the two abscissæ of the radius are equal in length; the first recurrent nervure is roundly curved from top to bottom, and is received shortly beyond the middle; the second has three slight curves, and is received before the middle of the cellule. The cubital nervure in the hinder wings is interstitial. Abdomen smooth and shining, blue; the apices of the segments piceous. The narrowed part of the petiole as long as the widened apex; the second segment is as long as the succeeding united.

Allied to *A. latifrons*.

TRYPOXYLON GENICULATUM, sp. nov.

Nigrum, trochanteribus tarsisque anterioribus, tibiis anticis basique tibiarum posticarum testaceis; alis hyalinis, stigmate nigro; abdominis medio rufo. ♀. Long. 13 mm.

Hab. Khasia (Coll. Rothney).

Antennæ black, the second joint rufous beneath; the scape and flagellum almost bare. The face and clypeus thickly covered with silvery pubescence; the front and vertex almost bare, finely punctured and opaque; below the ocelli is a shallow, but distinct, furrow; below this furrow is a stout keel, with oblique sides. Mandibles rufous; the palpi pale testaceous. Mesonotum shining, plumbeous; distinctly, but not strongly, punctured all over. The middle depression on the base of the median segment is wide, shallow, narrowed at the base, and finely transversely striated; the lateral furrows are wide, slightly narrower and deeper than the middle one, and striated like it; the apex of the segment has an oblique slope; its furrow is deep, with oblique sides; its apical half transversely striated. Pleuræ smooth and shining; the tubercles have a thick hair fringe behind; the furrow on the base of the mesopleuræ deep; the central fovea large, round. Mesosternum closely and finely punctured; the central furrow wide. Legs black; the anterior tibiæ and tarsi, all the trochanters and the four posterior knees, rufo-testaceous. Wings clear hyaline; the stigma and nervures black. Abdomen black; the apices and sides of the second and third segments rufous; the petiole is slightly longer than the second and third segments united; its base is distinctly channelled above; its apical fourth is dilated.

TRYPOXYLON TROCHANTERATUM, sp. nov.

Nigrum, abdomine rufo, petiole nigro; alis hyalinis, stigmate nervisque fuscis. ♀. Long. 12 mm.

Hab. Khasia Hills (Coll. Rothney).

Antennæ black, covered with a short pile. The face, the eye incision, and clypeus thickly covered with silvery pubescence; the clypeus projecting broadly in the middle and at the apex, where it is

smooth, shining and glabrous. Mandibles rufous, sparsely covered with long pale hair; the palpi rufo-testaceous. Front and vertex opaque, the front finely and closely punctured; the upper half with an indistinct furrow down its middle; the lower half keeled in the middle; the upper half of the keel distinctly furrowed in the centre. Thorax opaque; the pleuræ and apex of the median segment covered with silvery pubescence; the base of pronotum on the top raised; the raised part dilated laterally. The base of the median segment longitudinally striated; the rest of the basal region closely transversely striated; the central depression wide, not much widened towards the apex; the apex of the segment has an oblique slope, and has a narrow, deep furrow down the centre. Pleuræ smooth, the mesopleuræ covered with silvery pubescence. Legs black; the trochanters, the tibiæ in front, the anterior tarsi, the spines, and the claws rufous. Abdomen rufous; the petiole black, except at the apex; it is as long as the second and third segments united; the apical half is distinctly wider than the basal, which is furrowed down the middle; on the apex of the second segment is a small black mark; on the third a larger cleft mark.

VESPIDÆ.

ZETHUS QUADRIDENTATA, sp. nov.

Deep black; the mandibles broadly lined with pale yellow in the middle; wings fuscous-violaceous, paler at the base; the tegulæ bright red; apex of mandibles with two sharply pointed teeth in the middle, and a broader, blunter one on either side. ♂. Long. 15 mm.

Hab. Borneo.

Antennæ black, distinctly thickened towards the apex; the last joint brownish below; the hook long, curved, stout. Head closely, rugosely punctured; thickly covered with pale fuscous pubescence, which is longest on the front. Clypeus broader than long, sparsely punctured and thickly covered with long fuscous hair; its apex is broadly rounded; the teeth are only distinctly visible when looked at from below. There is a narrow reddish line on the pronotum near the tegulæ, where it is less strongly punctured than elsewhere. Mesonotum shining, not strongly punctured, the apical half less strongly than the base; the furrows extend from the base to the apex; they are deep and smooth. Scutellum punctured, but not deeply or closely; there is a short, deep longitudinal furrow on the apex behind; the post-scutellum is more strongly punctured than the scutellum; its sides are bordered by a distinct raised keel. The central part of the apical slope of the median segment is bordered laterally by a stout keel; between the two is a shorter broad keel; the enclosed space is coarsely transversely striated; the outer side and the apex of the metapleuræ coarsely reticulated. The middle of the propleuræ bears some stout keels; the apex is smooth, with a row of punctures on the lower edge. The upper part of the mesopleuræ is more strongly punctured than the lower, and there is a longitudinal punctured furrow in the middle; the apical two-thirds of the upper part of the metapleuræ are strongly obliquely striated. Legs black, thickly covered with pale pubescence; the knees and calcaria pale. Wings fuscous-

violaceous, the stigma and nervures black; the top of the second cubital cellule is not much more than half the length of the space bounded by the recurrent nervures. The petiole is coarsely rugosely punctured; on the sides the punctuation is coarser, more irregular, and running into reticulations.

(To be continued.)

MISCELLANEA RHYNCHOTALIA.—No. 5.

BY G. W. KIRKALDY, F.E.S. 1902c

(Concluded from p. 284.)

LÆMOCORIS POSEIDON, sp. nov.

Allied to *L. costæ*, Reuter, but the latter has much smaller eyes.

Clothed with sparse white pubescence. Head, pronotum, and scutellum blackish. Elytra brownish, basal third of corium (base itself excepted), a large spot on the costal margin near the apex, not reaching to the claval or membranal margin, whitish. Membrane fumate, iridescent. Antennæ brownish white, basal half of the first segment blackish brown, apical half dirty whitish. Beneath pale brownish, apex of coxæ and the rostrum whitish. Lateral margins of the sterna blackish. Eyes very large, occupying the greatest part of the head (in profile). Rostrum reaching well beyond posterior coxæ; second segment of antennæ one-fifth longer than the third, more than three times as long as the first, the latter reaching a little in front of the head. Vertex scarcely wider than an eye. Base of pronotum one-half wider than the head and eyes, twice as wide as the eyes together. Long. 3.2 mill. (with elytra), 2.5 mill. (to apex of abdomen), lat. 1 mill.

Hab. GUINEA, Addah (ex coll. Montandon).

LÆMOCORIS (?) RAVENAR, sp. nov.

Clothed with fairly long, somewhat bristly, yellowish hairs. Head, pronotum, scutellum and under side, antennæ, rostrum, &c., pale flavous. Elytra pale olivaceo-flavous, a whitish band across elytra at apex of clavus, and a large whitish spot at apex of corium, not reaching to interior margins. Head (in profile) twice as long as the thickened first antennal segment, vertex a trifle wider than the eyes together. Rostrum reaching to apex of posterior coxæ. Second segment of antennæ three times as long as the first, one-sixth longer than the third. Long. 3 mill. (including elytra), lat. $\frac{5}{8}$ mill.

Hab. JAVA (ex coll. Montandon).

SHANA, gen. nov.

Belongs to *Capsaria*; distinguished from *Polymerus*, Reuter, and *Pæciloscytus*, Fieber (to which it is remotely allied) by the very distinct stink-orifices; from *Charagochilus* by the slender collar and the length of the tarsi.

More or less punctured; clothed with pallid pubescence. Head smooth, polished, declivous, longer than high; width of vertex with eyes equal to twice the length of the first antennal segment. Vertex strongly and entirely marginate at base. Eyes oblique. Clypeus not very prominent. Pronotum at base nearly twice as wide as head, collar short, not as wide as the vertical margination. Pronotal callosities subconfluent, behind these the pronotum is punctulate; lateral margins somewhat rounded, not reflexed. Lateral margins of elytra ampliate, wider near the apex than the cuneus, fracture of the latter deeply marked; cuneus nearly isosceles, or a trifle wider than long. Posterior femora not strongly incrassate, reaching a little beyond apex of abdomen, tibiæ long and slender. Third segment of posterior tarsi longer than either first or second, second longer than first.

S. RAVANA, sp. nov.

Apex of head, two basal antennal segments, base of pronotum, scutellum, elytra, femora and base of tibiæ, underneath, black or brownish black. Remainder of head and pronotum reddish testaceous. Legs pallid fuscous. Stink-orifices pallid. Membrane fumate. Abdomen beneath smooth and polished. Second segment of antennæ three times as long as first, apical two-thirds incrassate a little, two and one-third times as long as the slender third segment. Rostrum reaching posterior coxæ. ♀. Long. 5 mill.

Hab. BIRMA, Chan Yoma (ex coll. Montandon).

Fam. LYGÆIDÆ (= COREIDÆ, olim).

ACANTHOMIA TOMENTICOLLIS (Stål, sub. *Clavigralla*, 1855)
= *tomentosicollis* (Stål, 1865).

○ Fam. TETIGONIIDÆ.

HARMONIDES, n. n. for *Parmula*, Fairm., nec Heyd., 1825 (Mollusca).

○ AGONDAS, n. n. for *Janthe*, Stål, nec Marseul, 1865 (Coleoptera).

THE PUBLICATION-DATE OF THE RHYNCHOTAL PART OF THE 'VOYAGE OF THE COQUILLE.'

BY G. W. KIRKALDY, F.E.S. ♀

WHEN preparing the first part of my work "On the Nomenclature of the Genera of the Rhynchota" (Entom. 1900, p. 25 *et seq.*), I was able to examine only a separate copy of the Rhynchotal portion of Duperrey's 'Voyage autour du monde sur la Coquille.' This was dated 1830, and as the work was cited by Laporte in 1832, and Boisduval in 1835, I did not question its correctness. Lately, however, I have been able to examine the whole work, and find that I was led into grievous error. The title-page of the zoological part, vol. ii. pt. 2, division 1, bears the date

1830, but the 'Avant-propos' is subscribed Nov. 15th, 1838, by Guérin Méneville, and this year is the actual date of the text, as is seen by a reference to the lepidopteral portion (p. 271, not 171, as stated in the 'Avant-propos'), where Guérin mentions the dates of publication of the various "livraisons" of the Atlas. Plates x.-xii. (Rhynchota) were published in 1831, but the text not till 1838. It may be noted that Hagen ('Bibliotheca Entom.') cited 1829-32 as the date, but had not seen the work. The references in Laporte and Boisduval are to the plates only. According to Guérin, the second volume, by Boisduval, of the 'Voyage de découvertes de l'Astrolabe' was published May, 1835.

This will unfortunately necessitate some slight alterations in my "Nomenclature," which will be effected at the end of part 1, now in the press.

WHAT IS MONOPHLEBUS, LEACH?

By T. D. A. COCKERELL.

IN Entom., September, 1902, p. 232, I gave an account of *Monophlebus* which I supposed would not need correction. Since then, however, some facts have developed which call for a reconsideration of the whole matter.

(1.) Mr. G. W. Kirkaldy wrote me that *Monophlebus* did not date from Westwood's publication, but from Burmeister, Handb. ii. p. 80, published in 1835. It is also to be remarked that Westwood's paper dates not from 1845, but from 1842 (*vide* Kirkaldy) or 1841 (according to a date pencilled by M. Wytsman on the copy before me).

(2.) The question arose, however, whether Leach himself published *Monophlebus* at any earlier date. Prof. C. H. Fernald has exhaustively investigated this matter, with the following principal results:—

(a.) Agassiz's 'Nomenclator Zoologicus' cites "*Monophlebus*, Leach, Probos. Ins. 1817." This doubtless refers to *Eprobos*. Ins. (Wern. Soc.), but Professor Fernald has examined this work, as well as several others by Leach, and finds no reference to *Monophlebus*. It seems very improbable that Leach ever published the genus. Samouelle's 'Compendium,' 1819, has no reference to *Monophlebus*.

(b.) Latreille ('Familles Naturelles du Règne Animal,' p. 429, 1825) published a genus "*Monophlebe*," with characters derived from the male antennæ. This name being only in the vernacular has no standing, but in 'Dictionnaire Classique d'Histoire Naturelle,' vol. ii. p. 99, published in 1827, the name is published as *Monophlebus*. The male antennæ are said to be moniliform, and of about 22 joints, which is an error known to have resulted from counting each joint as two, some as more.

So far, however, no really distinctive character had been given, and no type had been cited.

(c.) In Cuvier's 'Règne Animal,' edition of 1829, vol. v. p. 232, the genus is called *Monophleba*, is said to be of Dr. Leach, and we are informed that it is based on an insect from Java, with antennæ of about 22 joints, very hairy, and having thick and almost coriaceous wings. Still, however, the type is unnamed.

(d.) Next we come to Burmeister, as cited above. Here the genus is properly introduced, and the first species is *M. atripennis*, Klug, from Java. It does not appear that Klug himself ever published *atripennis*, but there is every reason to suppose that it was the species known to Leach and others, and made the type of the MS. genus *Monophlebus*. *M. dubius* (Fabricius) was from Sumatra.

(3.) On all grounds, therefore, *M. atripennis* is the type of *Monophlebus*. This species, along with *M. dubius*, is placed by me (*loc. cit.*) in a section characterized by having only two fleshy caudal appendages. No female of this section has been described, but we have assumed that the female must be similar to that of the other sections.

(4.) This assumption, however, proves to be unwarranted. Prof. C. H. T. Townsend has lately discovered a new form of *Icerya* (*Icerya littoralis* var. *tonilensis*, Ckll.) at Tonila in Jalisco, Mexico. He sent me both sexes, and the male reached me alive, having hatched *en route*. *This male has two long, hairy fleshy crimson processes at the end of the abdomen, nearly as long as the abdomen.* The female has the regular *Icerya* ovisac, well-ribbed, suffused with yellow at the base.

(5.) Since it is consequently just as probable (to say the least) that the females of *Monophlebus atripennis* and *M. dubius* pertain to the *Icerya* group as that they belong to what we have called *Monophlebus*, we find ourselves in a dilemma. I am not yet prepared to use *Monophlebus* in place of *Icerya*; or of a section of *Icerya* containing males with long caudal processes, which might be regarded as a valid genus, so as to save the well-known term *Icerya* for *purchasi*, &c. At the same time, we cannot safely use *Monophlebus* in the old sense. It seems best, on the whole, to provisionally recognize several genera, as follows:—

(a.) *Monophlebus*, with *M. atripennis*, *M. dubius*, and *M. (?) littoralis* (*Icerya littoralis*, Ckll.). The last I will still call an *Icerya*, pending new evidence from the Malay Archipelago.

(b.) *Tessarobelus*, with *T. guerinii*, Montr., and *T. championi* (Ckll.).

(c.) *Llaveia*, with *L. axin* (Llave) and *L. saundersii* (Westw.).

(d.) *Drosicha*, with *D. contrahens* (Walker), *D. maskelli* (Ckll.), *D. leachii* (Westw.), *D. burmeisteri* (Westw.), *D. corpulenta* (Kuwana), *D. crawfordi* (Maskell).

(e.) *Monophlebulus*, with *M. fuscus* (Mask.).

This unfortunately leaves several species, known only in the female, unclassified. So far as known, the female of *Monophlebus* has 7-jointed antennæ, of *Drosicha* 9-jointed, of *Tessarobelus* 10-jointed, of *Llaveia* 11-jointed; but it is by no means certain that these characters are severally always associated with particular forms of male. Mr. E. E. Green (*in litt.*) tells me that his *Monophlebus zeylanicus* belongs to *Sasakia*. Several American species must for the present be treated as *Llaveia*; viz. *L. cacti* (L.), *L. bowvari* (Sign.), *L. uhleri* (Sign.), *L. primitiva* (Townsend.), *L. mexicanorum* (Ckll.). *Monophlebus fortis* and *M. fulleri*, from Natal, may possibly go in *Llaveia*, but their males are much to be desired.

Monophlebus illigeri, Westw., and *M. raddoni*, Westw., are known only in the male; they have numerous short lateral abdominal processes. They come nearest to *Drosicha*, but their position is doubtful.

I am very greatly indebted to Professor Fernald for kindly communicating the results of his bibliographical researches.

East Las Vegas, New Mexico, U.S.A.: Sept. 30th, 1902.

P.S.—I have been trying to see whether any generic characters could be found in the larvæ of what has been called *Monophlebus*. Unfortunately very few larvæ are known, and, so far as I can see, these do not afford any good generic characters. They may be separated as follows:—

- Long hairs all round the body; antennæ 6-jointed, but the suture between 3 and 4 indistinct, 4 much longer than 3 *crawfordi*.
- Long hairs on the last seven segments; antennæ 6-jointed, 3 and 4 equal *arin*.
- Long caudal hairs, but relatively short hairs round the body 1.
- 1. Long caudal hairs four; antennæ 6-jointed, 4 shorter than 3 *serratulæ*.
- Long caudal hairs two; antennæ 5-jointed (*vide* Maskell) 2.
- 2. With very long brittle glassy threads; legs relatively longer *fuscus*.
- Without such threads; legs relatively shorter *maskelli*.

ON THE PARENTAL CARE OF THE CIMICIDÆ (RHYNCHOTA).

BY G. W. KIRKALDY, F.E.S.

WRITERS have often cited a species of Acanthosomatinae as one of the few known instances where insects display parental care for their young. The original observations of DeGeer were confirmed by Hellius, and have been reproduced or quoted in most entomological text-books. This habit is, however, probably not

exceptional among the Cimicidæ, for I have recently found a similar reference in the 'Ann. Soc. d'Agriculture de Lyon,' 1855 (2), vii. p. 91, where Montrouzier, in dealing with the bugs of Oceania, writes:—"The habits of the Scutellerines are interesting. Many deposit their eggs on the under surface of leaves out of reach of the rain, covering them with their body, and when they are hatched, lead their young ones, looking after them until they have acquired their wings. Their numerous family is seen following them along the trees, and crowding close to them at the least danger." I have also examined specimens sent to me in spirits of a species of *Spudaeus* (?), which seem to show similar signs.

NOTES AND OBSERVATIONS.

FOOD-PLANTS OF THE LARVA OF *CNEPHASIA SINUANA*, Stph.—Temporary separation from my library prevented me from penning an answer to Mr. A. Thurnall's note (*ante*, p. 265) in time for insertion in the November number of this magazine. When writing my paper on the life-history of *Cnephasia sinuana*, Stph., which was published in the Ent. Mo. Mag. ser. 2, x. 105-6 (1899), I was fully as aware as he is that the two totally distinct species—*sinuana*, Stph., and *pasivana* (*rectius pascuana*), Hb., had formerly been often confused together, and that their names had erroneously been used as synonymous by various writers, as, for instance, by Mr. G. Elisha in 1879. But since, in 1891, I had had some detailed correspondence with Mr. Elisha about his experience with these two species, and had specially guarded against any possibility of confusion or misunderstanding about them, my assertion, in the paper alluded to above, that he had bred *sinuana* from larvæ in flowers of *Chrysanthemum leucanthemum*, rested upon the clearest possible proof of the fact (*viz.* upon Mr. Sang's identification of the bred moths, as there mentioned), short of having actually seen with my own eyes the specimens in question. Moreover, Mr. Thurnall, in the same note in which he questions my statement, himself admits that that statement is beyond question, as the following facts will show. He says (*ante*, p. 265), "If the late Mr. Sang saw the specimens which were bred from *C. leucanthemum* and pronounced them to be *sinuana*, Stph., I of course must bow to his decision . . ."; whilst in my paper in the Ent. Mo. Mag. (*l.c.*), to which I referred Mr. Thurnall (*ante*, p. 194), I had, more than three years previously, clearly stated, on p. 105, that "His specimens (*i.e.* the specimens of *C. sinuana*, Stph., bred by Mr. Elisha from flowers of *Chrysanthemum leucanthemum*, as the context most plainly shows) were identified by the late Mr. J. Sang, who knew the true *sinuana* well."—EUSTACE R. BANKES; Norden, Corfe Castle, Nov. 17th, 1902.

PLUSIA MONETA IN ENGLAND.—I was interested in Mr. Lawrance's note on *P. moneta* (*ante*, p. 242), but I do not share his pessimism. My opinion is that it has come to stay, and I should not be surprised to hear that other Continental species which come to light should turn up also. My reason for thinking this is that *Porthesia chrysorrhæa*,

which is very plentiful on the French coast, has turned up at Newhaven, Folkestone, Dover, Margate, and Harwich, where there are fast steamer services running. The vessels load alongside a pier or wharf, where there are bright electric lights or incandescent lamps, and what is to stop an impregnated female flying on board, and getting carried over? This, I think, also applies to *Ennomos autumnaria* on the south-east coast, and *Callimorpha hera* in Devon. *P. chrysorrhæa* is now rapidly spreading over the South of England, through the medium of the hawthorn hedges on the railway banks, and has been taken as near London as Bromley.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E.

HAWK MOTH PUPATING ON TREES.—Referring to Mr. F. P. Dodd's note relative to the above (*ante*, p. 73). I am able to give the name of one sphingid that does the same here; this is *Nephele variegata*. In almost every instance the larva spins up in the leaves and between the small branches of the fig-tree. The cocoon, too, is very thick for this species of moth. Out here it is undoubtedly done for protective purposes, as on the few occasions when I have found a few where the ground and an exposed root of the tree has been used for pupation, the pupæ have nearly always been eaten by ants. The ants seem to commence the attack directly the change takes place, and when the pupa-case is soft, as I have ascertained by experiment that they will not attack a perfectly dry pupa of this moth. The pupa is very active indeed, and when it is touched rolls itself completely round and round, and then gives a series of jerks for some time afterwards. It is very common here, and I have found as many as seventeen on one tree, but they were very badly ichneumonated. I have also found pupæ of *N. variegata* in holes of trunks of the trees, and, when so placed, the larvæ had carefully spun a thick web over the opening. This moth always emerges from the pupa between 10 and 12 p.m., and flies at dawn, feeds at the flowers of honeysuckle, and is the swiftest flier I know of for its size.—G. F. LEIGH; Durban, Natal.

LYCÆNA CORYDON, AB.—In the note on this aberration (*ante*, p. 284), the sex symbol was accidentally omitted. The specimen is a female.

VANESSA URTICÆ, AB.—Early in September this year I obtained a well-marked variety of this butterfly, differing from the ordinary type in the following particulars:—It is somewhat small in size; the two outer blotches on the costal margin of the fore wing are confluent; the two black spots near the anal angle are absent; the hind wings are entirely black, and there is no trace of blue on the wings whatever. In fact, it seems to correspond to the third variety figured in Newman's 'British Butterflies.'—B. L. MIDDLETON; Mullingar, Ireland, Oct. 27th, 1902.

[Somewhat similar aberrations of *V. urticæ* are figured in the 'Entomologist' for 1896, p. 73, and 1900, pl. iii. fig. 1; see also Entom. xxxiii. p. 103.—ED.]

CHRYSOPHANUS DISPAR, HAW.—Will lepidopterists who possess specimens of this species kindly communicate with J. R. Charnley, F.E.S., Howick House, Preston, Lancs., who states that he is endeavouring to find out how many specimens of British *C. dispar* there are in existence.

PROFESSOR ROBERT WALLACE is preparing for publication the 'Reminiscences' of the late Miss E. A. Ormerod. This was the work of her later days, and was enjoyed by her as a relaxation from the more arduous labours of Agricultural Entomology. Although the Autobiography was not completed, yet there is much material of a very interesting character on which to work. Professor Wallace would be glad to receive such letters from Miss Ormerod as her correspondents may deem of sufficient importance, together with any other information which they think will be of interest to the general public. His address is The University, Edinburgh.

CAPTURES AND FIELD REPORTS.

COLIAS EDUSA IN THE NEW FOREST.—About Aug. 14th last I saw a specimen of *C. edusa* flying across Butt's Lawn, near Brockenhurst, and a friend saw one in the same place a day or two later.—E. C. ANSORGE; Bedford Park.

COLIAS EDUSA IN KENT IN 1902.—I took fine specimens of *C. edusa* at Margate, between Aug. 23rd and 30th; one example was seen flying over Peckham Rye on Sept. 8th; and at Deal, on Sept. 9th, I saw two specimens.—C. W. COLTHRUP; 127, Barry Road, E. Dulwich, S.E.

VANESSIDÆ IN 1902.—*Pyrameis cardui* was by far the most plentiful Vanessid in the Isle of Thanet; it abounded in every clover or lucerne field. I noticed only a few *Vanessa urticae*, and but one specimen of *V. atalanta*.—C. W. COLTHRUP.

AGROTIS CINEREA.—I captured a specimen of this insect, at sugar, on the Sussex downs, in June last.—C. W. COLTHRUP.

DASYCAMPA (ORRHODIA) RUBIGINEA.—From the egg my kind friend Mrs. Fogden, of Apuldram, near Chichester, skilfully reared to the pupal stage about a dozen *O. rubiginea*, which she most generously handed over to me in the flower-pot in which the larvæ pupated. The first of these beautiful "chestnuts" emerged on Oct. 9th, another on the 13th, another on the 14th, one on the 21st, one on the 22nd, another on the 28th—six fine specimens up to the time of writing. It is somewhat singular that one only emerged on each occasion.—JOSEPH ANDERSON; Chichester, Oct. 29th, 1902.

ENNOMOS EROSARIA AND HIMERA PENNARIA.—On Oct. 10th last I took a specimen of *E. erosaria* on a gas-lamp in this district. *H. pennaria* has been exceedingly abundant in this locality; I counted no less than sixteen in an evening's walk on Oct. 29th last.—H. G. FAYE; 3, Maryland Road, Bowes Park, N., Nov. 5th, 1902.

DEILEPHILA LIVORNICA IN SOUTH DEVON.—Mr. J. Jäger (*ante*, p. 287) records the capture of the larva of *D. livornica*, and says, "I am told that there is no record of this rare moth having been previously found in the larval state in Britain." If reference is made to the 'Entomologist,' vol. v. p. 169, it will be seen that it was obtained by me in 1870. I figured the larva, and the drawing is reproduced in Barrett's 'British Lepidoptera,' vol. ii. The same year Mr. Rickard obtained

nine larvæ and bred the moths; the larvæ were found on dock in a nursery garden in Plymouth (*vide* Entom. vi. 522), and fed up on the same.—G. C. BIGNELL; Saltash, Cornwall, Nov. 3rd, 1902.

PLUSIA MONETA NEAR TUNBRIDGE WELLS.—This insect made its appearance much later than was the case last year. On June 10th I went over to my old home at Bidborough (near Tunbridge Wells), to search for it upon the plants where I was so successful last year about the same date; but after a long hunt I only obtained three young larvæ, although they were in the chrysalis state at the same time last year. A fortnight later—June 24th—I revisited the garden, when upwards of three hours' search in the broiling sun produced three cocoons only. The experience was disappointing, to say the least of it, after having obtained three dozen or so the year before. The protective nature of these cocoons is very striking, for those which are placed upon the under side of the yellow withered leaves of the *Delphinium* are invariably of a beautiful golden colour, which exactly harmonises with the leaf, but if one of the larvæ be placed in a box it will usually spin a pure white cocoon.—H. W. SHEPHEARD-WALWYN; Dalwhinnie, Kenley, Surrey, Oct. 18th, 1902.

LATE APPEARANCES.—I was at Charmouth on Oct. 27th, and was surprised to find *Satyrus ianira* and *Nonagria lutosa* still out. However, I well remember taking bright and fresh specimens of the former at Ventnor, on Oct. 11th, 1868.—C. W. DALE; Glanvilles Wootton, Nov. 3rd, 1902.

GONEPTERYX RHAMNI IN NOVEMBER.—On Nov. 13th I saw, in the morning, near Horsley, Surrey, a specimen of *G. rhamni* on the wing, and tried to catch it, but without success. By its colour it appeared to be a male.—H. WOODGATE; Teddington.

DRAGONFLY IN LONDON.—Whilst walking along Queen Victoria Street on Sept. 29th last, I was surprised to see a species of *Æschna* (*cyanea*, I think), flying swiftly along the road. The weather was cold and dull at the time.—STANLEY A. BLENKARN; East Dulwich, Sept. 30th,

CERASTIS ERYTHROCEPHALA NEAR BOURNEMOUTH.—On Nov. 7th I took, at sugar, near Bournemouth, a fine male specimen of *C. erythrocephala*. Major R. B. Robertson had taken one also three weeks previously, about two miles away from my locality.—W. G. HOOKER; 125, Old Christ Church Road, Bournemouth, Nov. 30th, 1902.

CERASTIS ERYTHROCEPHALA NEAR BOURNEMOUTH.—Sugar has been giving better results lately. I took a fine *C. erythrocephala* on Oct. 14th last.—R. B. ROBERTSON; Pokesdown, Nov. 16th, 1902.

CAPTURES OF RARE TRICHOPTERA AT GLANVILLES WOOTTON.—*Hydropsyche ornatula*, McLach., one on Aug. 14th, 1900. *Trienodes conspersa*, Ramb., occasionally; I have also taken it at Torquay, and Mr. D. Cork used to meet with it in Dovedale. *Tinoides unicolor*, Pict., occasionally; I have also taken it at Ventnor. *Micropterna sequan*, McLach., one on Sept. 19th, 1901.—C. W. DALE; Nov. 3rd, 1902.

THE SEASON OF 1902.—The first entry in my diary for 1902 is the sight of *Gonepteryx rhamni* and *Vanessa urticae* on March 5th. On the

following day *V. polychloros* was first seen, and during the rest of the month the first and last named were very plentiful, *urticæ* being seen in greater numbers during April than March. On April 17th a batch of larvæ of *Polygonia c-album* emerged from ova sent me from Yorkshire, and these fed up very well on elm. They pupated from May 26th till May 30th, and the resultant imagines appeared from June 8th till June 17th. The under sides of all were of the pale ochreous ground colour. On April 27th the first *Cyaniris argiolus* was taken, but this species was not nearly so common here this year as it was last. I took a good number of the second brood near St. Leonard's on August 15th, and noticed that these were much larger than the specimens of the early brood taken in Dorking. *Pieris rapæ* and *P. napi* began to appear during the first week in May, and many very small specimens of each were seen. On May 4th the first of a batch of forty *Melitæa cinxia* larvæ, which had been sent me from Ventnor about the middle of April, pupated, and they continued to do so till May 26th; but only fourteen reached the pupa stage, all the others being stung. I counted twenty-four cocoons of "ichneumons" that emerged from one larva, but about fourteen or fifteen was the usual number. They developed into little black flies. Thirteen imagines of *M. cinxia* came through successfully, but the fourteenth failed to develop its wings properly. The first appeared on June 15th, and the last on June 27th. On May 24th a good number of male *Euchloë cardamines* were seen, and from that date till June 22nd this species was very plentiful. On May 24th, also, *Nemeobius lucina*, *Hesperia malvæ*, and *Thanaos tages* were observed for the first time. The first-named was not nearly so abundant as it was last year, doubtless owing to the scarcity of sunshine; but a good number of ova were discovered on the under side of cowslip leaves, and I reared a few through to the pupa stage. The young larvæ began to appear on June 19th, but about sixty per cent. of them died before pupation. They took a long time to feed up, as it was well into August before the last one had changed. *Callophrys rubi* was first seen on May 24th, and several were taken from that date till the first week in June, but never in any numbers. *Pararge egeria* was taken on May 28th, on which date *Hesperia malvæ* was to be seen in profusion. *Chrysophanus phleas* was seen on May 31st, but the early brood did not seem nearly so plentiful as that of August, when I found it quite common at Bembridge, in the Isle of Wight. *Pieris brassicæ* was first seen on June 2nd, and in August very fine specimens of this species were observed in great numbers at Bembridge and at St. Leonard's. *Lycana icarus* was first noticed on June 4th, but, owing to the absence of sunshine, few were seen on the wing. Boxing off the long grass in the evening produced two fine varieties (*ante*, p. 218), one a gynandrous specimen, and the other having only one spot, besides the marginal ones, on the under side of each wing. A very small specimen was taken at Bembridge on Sept. 8th, and a single male was seen in the long grass on Oct. 7th. On June 8th *L. astrarche* was taken, and at Bembridge, during the latter part of August, several specimens, including one very small one, were caught. My experience with this insect is that it is never seen in any numbers, four being the most that I have ever taken at one time on the same ground. *L. bell-argus* was to be taken from June 8th till June 24th, after which date

the specimens seen were worn. This species, as well as *L. icarus*, and later on *L. corydon*, were caught far more plentifully this year in the evening than during the daytime. On June 9th hibernated specimens of *Vanessa cardui* were swarming on the shore near Bembridge, and the newly emerged insects could be taken in any number during the latter part of August. This was by far the commonest species of *Vanessa* observed this year, *V. io* being fairly plentiful, *V. urticae* rare at Bembridge, and *V. atalanta* far from common. On June 9th, and again in August, *Pararge megera* was swarming. June 18th, which I have entered in my diary as "the first really fine day for weeks," was marked by the profusion of *Hesperia malvæ* and *Euchloë cardamines*, and by the fact that several females of *Nemeobius lucina* were seen ovipositing. I took one female and placed her in a pill-box with a cowslip leaf, and by the time I had reached home she had deposited twenty-four ova, some on the leaf and others on the box. On June 21st we found a large number of very fine larvæ of *Vanessa urticae*; they were so large that I took a few, which pupated the next day; and the resultant imagines, which emerged on July 3rd, are not only the largest but also the darkest specimens of this insect I have ever seen. Their markings, however, are quite normal. A larva of *Epinephele jurtina* (*ianira*), found by chance in long grass, pupated on June 22nd, and the imago appeared on July 9th. On June 24th *Lycæna albus* was first taken, but this species was never plentiful in Dorking this year. On June 28th an imago of *Thecla w-album* emerged from the pupa; the larva was found on Boxhill, and pupated on June 10th. *Hesperia sylvanus* was first seen on June 28th, and from then till July 14th it was common on Rammore. Some German larvæ of *Vanessa antiopa* began to pupate on July 8th, and the first imago appeared on July 24th. It was a curious variety, without a trace of the blue spots on the upper wings, and with only one small spot on each of the lower wings (*ante*, p. 285). The other specimens were quite normal. *Aphantopus hyperanthus* was taken on July 9th and following days, but was far from being as plentiful as in 1901. On July 12th *Hesperia thaumas* was first seen, and from then till the end of August was very common at Dorking, St. Leonard's and Bembridge. On July 12th, also, *Satyrus semele* was first noted, and some very good specimens were taken near the Culver Cliff, Isle of Wight, on Sept. 4th. On July 17th a female *Lycæna arion*, sent from Bude, deposited eight ova on wild thyme, but they produced no larvæ. Although I had made many attempts, I did not succeed in taking *Hesperia comma* this year till July 26th, and then I only obtained one specimen. Several were captured by others afterwards, but as I had to leave Dorking on the 28th, I was unable to go for it again. A fine larva of *Pieris brassicæ* pupated on July 27th, and a female emerged from it on Aug. 16th. *Epinephele tithonus* and, of course, *Cænonympha pamphilus* were common, the latter from the beginning of July onwards, and the former from the beginning of August. On Aug. 29th I came upon a swarm of *Lycæna corydon*, but they had emerged some time, and it was difficult to find males in good condition, though the females were perfect. They were on a small patch of long grass close to the sea, by the Culver Cliff. I saw two specimens of *Colias edusa*, both males, on the shore by Bembridge

Point, one on Sept. 5th, and the other on Sept. 8th; but I had no net with me, so did not take them.

The above represents the bulk of my observations among the Diurni during the past year. Two facts seem to stand out prominently, when one looks back upon the season as a whole: the weather has been atrocious, and even moderate success has only been gained after unusually hard work; and nearly every species has been much later than usual in its time of appearance.—F. A. OLDAKER; Parsonage House, Dorking, Oct. 23rd, 1902.

NOTES FROM SHROPSHIRE.—*Asthena blomeri* was very common at Hopton Wagers, near Clevening Mortimer, during the first week of July last. It occurred only in some covers bordering a small stream, resting on the trunks of beech-trees; and I also beat it out of bramble-bushes growing amongst the trees. The part where it was to be found was only about three quarters of a mile long and about fifty yards wide. Other captures in July:—*Argynnis selene*, common in lanes; *A. euphrosyne*, *Pararge egeria*, *Thecla rubi*, *Lycana icarus*, *Syrichthus malva* (one), *Hesperia sylvanus*, *Zygana filipendula*, very common in some fields; *Dasychira pudibunda*, a few; one female laid several batches of eggs, from which hatched out over three hundred larvæ. *Thyatira batis*, caught last year, as also were *Chareae graminis*, *Melanthia albicillata*, *Melanippe montanata*. *Triphana pronuba* swarmed round laurel bushes in full bloom.—C. R. Y. BOXER; 151, Burnt Ash Hill, Lee.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—November 5th, 1902.—The Rev. Canon Fowler, M.A., D. Sc., F.L.S., President, in the chair.—Lieutenant T. Delves Broughton, R.E., of Alderney, Channel Islands; Mr. Arthur Percival Buller, of Wellington, New Zealand, and of the Inner Temple, E.C.; the Rev. Canon C. T. Cruttwell, M.A., of Ewelme Rectory, Oxfordshire; Mr. R. S. Hole, of the Rectory, North Tawton, Devon; and Mr. W. E. Sharp, of Ledsham, Shakespeare Road, Hanwell, W., were elected Fellows of the Society.—The Secretary informed the meeting that a request for certain alterations in the bye-laws, signed as required by Chapter 21 thereof, having been received by the Council, Mr. Arthur J. Chitty had been good enough to draft the necessary amendments. Mr. Chitty then read the proposed amendments, and explained the course to be taken to carry them into effect.—Mr. H. J. Elwes, F.R.S., exhibited, on behalf of Mrs. Mary de la Bèche Nicholl, a collection of butterflies made by her in February, March, and April, 1902, in Southern Algeria; also a collection of butterflies afterwards made by her in the Picos de Europa, in Spain; the latter collection comprised about eighty-five species, and was made in twenty-five days. Mr. Elwes remarked that these collections contained several interesting species of *Erebia*, *Lycana*, and other genera, and included three species not at present represented in the British Museum Collection.—Dr. Chapman exhibited, and made remarks on, two butterflies taken last July at Bejar, in West Central Spain, both notable as being very decidedly larger than any forms of the same species recorded from any other locality. He stated that one of them

belonged to a form of *Lycana argus* (the *L. ægon* of the British list). They were taken about one and a half miles east or south-east of Bejar on July 9th and following days. He said that he proposed to name this form var. *bejarensis*.—Mr. R. South exhibited four specimens of a large form of *Cupido minima* (*Lycana minima*) from Cumberland, sent to the Natural History Museum by Mr. Mousley, of Buxton. He also exhibited, on behalf of Mr. J. H. Fowler, of Ringwood, a series of *Lithosia deplana*, Esp., from the New Forest, showing interesting variations in both sexes, but especially in the females. It was stated that Mr. Eustace Bankes had recently recorded somewhat similar aberrations of the species from the Isle of Purbeck.—Mr. Hamilton Druce exhibited a specimen of *Limenitis populi*, L., caught whilst being chased by a small bird in July, 1901, near Riga, Russia; also a specimen of *Sesamia nonagrioides*, Lefeb., bred from a larva found feeding in the interior of a banana.—Mr. J. H. Carpenter exhibited a gynandromorphous specimen of *Lycana icarus*, having the coloration of the male on the left side, and that of the female on the right side, captured on Ranmore Common, Surrey, in June last; also several aberrations of this species from Ranmore Common and the Isle of Wight. He also showed specimens of *Vanessa antiopa*, bred from German larvæ, including a remarkable aberration, in which the usual blue spots on the upper wings were entirely absent.—Mr. H. St. J. Donisthorpe exhibited a foreign specimen of *Quedius suturalis*, lent him by Mr. Keys, of Plymouth, and a British specimen taken by himself at Gravesend in 1891; also, for comparison, a specimen of *Quedius obliteratus* taken at Plymouth. He said that most of the specimens of so-called *Quedius suturalis* in British collections were really *Q. obliteratus*.—Mr. Pickett exhibited a remarkable series of *Angerona prunaria*, the result of four years' interbreeding between dark males from Raindean Wood, near Folkestone, and light-coloured females from Epping Forest; also unicolorous light orange-yellow males, light yellow females, dark orange males sprinkled with black, and other unusual aberrations.—Professor E. B. Poulton, F.R.S., exhibited a series of lantern slides prepared from negatives taken by his assistant, Mr. A. H. Hamm, of the Hope Department, and Mr. Alfred Robinson, of the Oxford University Museum. The slides represented a series of the larvæ and imagines of British moths photographed under natural conditions. Mr. Hamm's photographs of moths clearly showed the attitude of the insect in relation to the background which it had selected. Some of the species were shown upon their normal background of the bark of various kinds of trees, others upon lichen-covered stone walls. Mr. Robinson's photographs similarly represented the larvæ of species of British moths in their natural attitudes upon the food-plants. Prof. Poulton also showed a representation of the pupa of *Limenitis populi*, prepared from Portschinski's figure and description, and explained the highly ingenious hypothesis by which the appearances are accounted for by the Russian naturalist.—Mr. C. O. Waterhouse communicated a paper by Mr. L. R. Crawshay, entitled "On the Life-history of *Drilus flavescens*, Rossi."—H. Goss, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—October 23rd, 1902.—Mr. F. Noad Clark, President, in the chair.—Mr. Inglis, of Clapham, and Mr. Scollick, F.E.S., of Wimbledon, were

elected members.—Mr. South, on behalf of Mr. Fowler, of Ringwood, exhibited varieties of the female of *Lithosia deplana*: (1) grey in colour, with yellow costa extending to the fringe = var. *ochreata*; (2) with fore wings almost as yellow as *L. sororecula*, and the hind wings only slightly tinged with grey; they were from the New Forest. Mr. Tutt pointed out that variation in the Lithosiids took one of two directions, either a general darkening or an intensification of the yellow.—Mr. Dennis reported that on October 9th all stages of *Cyaniris argiolus* were to be found at Earl's Colne, Essex.—Mr. Turner, a number of examples of *Hydriomena furcata* (*Hypsipetes sordidata*) illustrative of local forms, and remarked upon the inconvenience caused by the continual change of the specific names.—Mr. B. W. Adkin, some remarkable forms of *Pachygastria* (*Bombyx*) *trifolii*, bred from larvæ taken on the Scilly Islands. One female was conspicuously light in colour, and the wedge-shaped markings of the fore wings of several males were much enlarged.—Mr. Lucas showed a number of lantern-slides illustrating (1) choice spots in the New Forest; (2) protective resemblance in insects; (3) various botanical characters of interest; and (4) some of the idiosyncrasies of collecting.

November 13th.—The President in the chair.—Mr. Colthrup exhibited a bred series of *Lymantria monacha*, originating from the New Forest, and exhibiting considerable black suffusion.—Mr. R. Adkin had had a number of larvæ from the same source, but the few imagines he bred were quite normal.—Messrs. Harrison and Main, long bred series of *Aglais* (*Vanessa*) *urtica* from Eastbourne, Delamere Forest, and Argyllshire, and contributed notes on the characters of the several races. Those from the last-named locality were generally darker.—Mr. R. Adkin, a series of *Lycæna corydon* from Eastbourne, taken between Sept. 18th and Sept. 25th, and called attention to the frequency of blue scaling in the females. He also showed melanic forms of *Acronycta menyanthidis* from Selby, Yorkshire.—Mr. H. J. Turner, (1) a bred series of *Hypsilophus marginellus* from Banstead Downs, he also reported it from the Roman Road, Mickleham; (2) a long and very varied series of *Paridisca corticana*, taken on a wet day in July in Epping Forest; he referred to the exceedingly perfect protective resemblance exhibited by the species, as well as to the great range of variation; (3) a female *Pechypogon barbalis*, set to show the secondary sexual characters existing in the extreme development of tufts of hairs on the fore legs; and (4) two varieties of *Polyommatus icarus* from Banstead, one, a small male, with all the basal spots of the under side missing, the marginal markings very faint or suppressed, and only a few of the submarginal ocelli remaining; the second, a female, with much-enlarged ocelli on the submargin.—Mr. Kaye, a fine female variety of *Fidonia atomaria*, having the ground colour very light and much increased in area at the expense of the dark bands; and a series of *Tiliacea anrago*, bred from ova laid by the only female he had ever captured, at Worcester Park, Surrey.—Mr. H. Moore read a paper entitled "A Visit to the Forest of Arques (Dieppe)," and showed a number of species of insects of various orders in illustration. Perhaps the most interesting were a series of dark, small, and thinly scaled *Canonympha arcania*, no doubt indicative of the fact that here the species was near the limit of its area of distribution.—Dr. Chapman

read a paper entitled "On Inflation in Insects," summing up the results of more than thirty years' observation and experiment. In the discussions which followed, Mr. Tull pointed out that the problem was as yet unsolved, why *C. arcania* and other species characteristic of very adjacent Continental areas were absolutely non-British.—HY. J. TURNER (*Hon. Rep. Sec.*).

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—September 15th, 1902.—Mr. R. C. Bradley in the chair.—Mr. G. W. Wynn showed various Lepidoptera, including *Protoparce convolvuli*, taken at Hampton-in-Arden, September 28th, 1901; series of *Cymatophora duplaris* from Wyre Forest, Sutton, and Hay Woods, near Knowle; those from Wyre (a long series) were typical, with well-marked transverse markings and quite pale median bands; whilst those from Sutton and Hay Woods were all dark, and approaching a unicolorous character, the pale markings practically gone and the dark ones indistinct, one dark band beyond the middle being fairly distinct, and the others quite faint. He said others he had from Tamworth were also of this dark form, and suggested that it might be due to the neighbourhood of Birmingham to these three localities; also a fine variety of *Xanthia lutea* Strom. (*silago*, Hb.), from Hampton-in-Arden, which showed a broad intensified median band and an intensified costal spot near the base of the wings, and practically no other markings, the small spots being absent; also *Cymatophora octogesima* and other insects from Wyre Forest.—Mr. A. H. Martineau, *Volucella inanis* from Littleham, South Devon, where it was taken on rubus flowers on August 6th, 1902.—Mr. J. T. Fountain, *Chærocampa elpenor* bred from larvæ found near Shirley in 1901; also a series of *Spilosoma menthastris* bred from a nearly unicolorous one; a few resembled the parent, and these, he said, appeared first.—Mr. R. C. Bradley, *Aculeata* from Barmouth, 1902: *Agania variegata*, a good series of both sexes, taken in June and August; and *Sapyga 5-punctata*, a series with one male only, taken in June; both must have been common, but hard to take.—Mr. Colbran J. Wainwright, rare Tachinidæ: *Paraxonista fimbriata* from Tan-y-bwlch, North Wales, 1901; and *Phytomyptera nitidiventris* from Bournemouth, 1901; both taken by Mr. R. C. Bradley.—Mr. W. H. Flint exhibited the following Lepidoptera:—*Drymonia chaonia*, a fine bred one from the Forest of Dean district; *Notodontu trepida*, found at Kingswood, just emerged; *Larentia cuculata* (*sinuata*) and *Acidalia rubiginata* (*rubricata*), one of each, from South Devon, between Marychurch and Newton Abbott; also three very fine varieties of *Larentia sordidata* (*elutata*) from the Forest of Dean, which showed a broad pale median band, with a broad dark hind marginal band, and a broad dark band before the median one; also *Sesia chrysidiformis* and *S. ichneumoniformis* from the Forest of Dean district; of the latter he showed a fine series, and said he had traced it to its headquarters, where he found it commonly flying over trefoils and other low-growing flowers; he could have taken two dozen a day easily; also a fine specimen of *Lycena semiargus* (*acis*), which he took himself at Wolvey, in Warwickshire, in 1896. He did not recognize it till he got it home, but it is in fine condition and unmistakable; also a specimen of *Agriades comma*, said to have been taken in Warwickshire, near Stoneleigh, but needing confirmation.

October 20th.—Mr. G. T. Bethune-Baker, President, in the chair.—Mr. C. J. Wainwright showed a specimen of *Meriania argentifera*, Meig., a Tachinid new to Britain, taken by Mr. W. J. Lucas in the New Forest on April 30th last; also *M. puparum* for comparison.—Mr. W. H. Flint, various Lepidoptera: *Larentia unangulata* from Yardley and Hay Wood; *L. sordidata* (*clutata*), and *L. autumnalis*, Ström. (*impluviata*, Hb.), showing a great range of variation; *Boarmia repandata*, dark specimens, one from Sutton very black, but not suffused, the markings clear but all very dark grey, not brown; also others from Forest of Dean almost as black, and a dark one from South Yorkshire, which, however, was brown and not grey in colour; dark *Hybernia leucophaearia* from the Forest of Dean; *Lygris populata*, dark suffused specimens from near Glasgow; *Calymnia trapezina*, a very dark specimen from Sutton of a deep olive green, nearly black; *Hybernia marginaria*, nearly black suffused specimens from Sutton; *Larentia suffumata*, a suffused but not black specimen, also from Sutton. He pointed out that amongst these specimens were four species from Sutton with more or less tendency towards melanism.—Mr. H. Willoughby Ellis, a series of the Midland species of the coleopterous genus *Cercyon*, Leach; fourteen species out of the total of eighteen found in Britain occur near Knowle, including *granarius* and *quisquilius*.—Mr. J. T. Fountain, Lepidoptera, including *Mamestra serena* from Sutton, Knowle, Sparkbrook, &c.; *Dianthæcia nana* (*conspersa*) from Jersey; *Eurymene dolabraria* from the Wyre Valley; &c.—Mr. G. W. Wynn, various Lepidoptera, including *Hylophila bicolorana* (*quercana*), two fine specimens taken in Wyre Forest on August 22nd last; *Agrotis neglecta*, one fine one taken at the same time and place; *Zeuzera pyrina*, a pair from Hampton-in-Arden taken *in cop.*, the female being quite double the size of the male; and *Metopsilus porcellus*, taken at Hampden-in-Arden on June 26th last.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The opening meeting of the winter session, held on October 13th, in the Royal Institution, Liverpool, was largely attended. In the unavoidable absence of the President, Mr. S. J. Capper, Dr. John Cotton, F.E.S., of St. Helen's, occupied the chair.—Mr. E. J. B. Sopp proposed, and Mr. F. C. Thompson seconded, that Messrs. Oscar Whittaker, of Bolton; James Roland Charnley, F.E.S., of Preston; A. G. Wallington, of Warrington; John Lea, and J. Jervis Richardson, of Liverpool, be elected members of the Society. It was unanimously decided to hold the next meeting in Liverpool, on Nov. 10th, and that a meeting be held in Warrington, on Dec. 8th, provided the secretaries were able to make all necessary arrangements for the same. A large and interesting display of insects was shown by members, amongst the more striking being the following:—Fine series of Lepidoptera captured during 1902, by Dr. J. Cotton, on Simonswood Moss and in North Devon, in exhibiting which he gave much valuable information regarding the methods employed in the taking of *Notodonta dictæoides*. Captures at the Delamere field-meeting by Mr. F. N. Pierce included excellent specimens of the local *Tephrosia biundularia* var. *delamerensis*, *Cidaria corylata*, *Thera variata*, and other moths.—Mr. C. F. Johnson exhibited very fine black varieties of *Zygana minos*. Mr. J. R. le

Brockton Tomlin, F.E.S., a valuable collection of British Coleoptera, containing, amongst other scarce species, series of recent captures of the very rare *Hydrovatus clypeatus*, a water-beetle that had not been taken for many years; the rare "skipjacks," *Elater miniatus*, *E. lythropterus*, and *E. sanguinolentus*; *Anthaxia nitidula*, *Agrius biguttatus*, and *Cryptocephalus sexpunctatus*, from the New Forest; *Phosphaneus hemipterus*, from Southampton; and the beautiful longicorn, *Saperda scalaris*, from Sherwood.—Dr. G. W. Chaster, recent captures in the Southport district, which included many unique additions to the Lancashire county list. Of the many species in his exhibit, perhaps the following attracted most attention:—*Medon obsoletus*, *Thinobius brevipennis*, *Pseudopsis sulcata*, *Anisotoma furva*, and *A. ciliaris*. The extremely local *Ammæcius brevis*, *Ægialia rufa*, *Telephorus darwinianus*, *Gymnetron collinus* and *G. linaria*, and *Ceuthorrhynchus euphorbiæ*.—Mr. J. T. Wardley, a case of *Cossus ligniperda*, bred from Formby larvæ; and Mr. Oulton Harrison (Wavertree), on behalf of Rev. T. Eddrup, a box of *Emmetica cervinata*, from Bremhill, Wilts, kindly sent for distribution.—Mr. R. Tait, fine varieties of *Boarmia repandata*, some rosy forms of *Agrotis agathina*, a beautiful series of *A. ripe* from Cumberland, and bred varieties of *Acidalia contiguaria*, including two unique aberrations.—Mr. J. Roland Charnley, a fine male *Chrysophanus dispar*.—Mr. J. Collins, long bred series of *Eupithecia debiliata*, from Stafford; *Crambus warringtonellus*; *C. hamellus*, from Lancashire Mosses, *Lithosia sericea*, and *Exæretia allisella*.—Mr. H. B. Prince, a remarkably fine series of *Erebia cassiope*, and other species.—Mr. B. Crabtree, a long series of *Cænonympha typhon* (*davus*) var. *rothliebi*, arranged to show the extreme range of variation on the under side. Mr. W. Raeper, Scotch captures during the present season, including many interesting moths.—Mr. J. Jarvis Richardson, exotic Lepidoptera, including *Intomeris io*, reared this season; also a series of beautifully produced photographs of British lepidopterous larvæ. Mr. E. J. B. Sopp, a collection of palæarctic and exotic Forficulidæ, which included representatives of our giant Christchurch earwig, *Labidura riparia*; *Anisolabis mauritanica*, from Tunis; *Spongiphora Croceipennis therminieri*, from Santo Espirito (Brazil); *Chelidura bolivari*, from Castile; *Apterygida japonica*, from Japan, and *Forficula pubescens*, a Southern-European earwig recently taken at Colchester by Mr. Harwood.

The usual monthly meeting was held in the Royal Institution, Liverpool, on November 10th, Dr. J. Cotton (St. Helens) in the chair.—Messrs. Oscar Whittaker (Bolton), J. R. Charnley, F.E.S. (Preston), A. G. Wallington (Warrington), John Lea, and J. J. Richardson (Liverpool) were duly elected members of the Society.—The arrangements made for the forthcoming meeting to be held in Warrington having been approved, a highly interesting paper on "Some Famous Collecting Grounds" was communicated by Mr. Oulton Harrison (Wavertree), whose instructive descriptive account of various entomological "centres" in Switzerland and Britain was rendered still more attractive by nearly two hundred lantern views. Many of the typical lepidopterous and other denizens of the Meiringen district, Lucerne, Rosenlauri, &c., were enumerated, and descriptions given of favourite haunts of some of our insular insects and birds in the New, Epping,

and Delamere Forests. A hearty vote of thanks having been accorded the lecturer, the following exhibits were described and shown:—British *Donacia*, by Messrs. J. F. Dutton and J. R. le B. Tomlin; *Emmetica cervinata* (Wilts), by Mr. O. Harrison; Lithosidæ, by Mr. F. N. Pierce; hymenopterous captures during 1902, by Mr. F. Birch; *Trigonogenius globulum* from Hoylake, and Ixodidæ from leg of a tortoise, by Mr. W. H. Jennings; *Metecus paradoxus*, and recent coleopterous captures at Liverpool, by Mr. Guy A. Dunlop; some magnificent exotic Lepidoptera, and photographic slides of British lepidopterous larvæ shown upon the screen, by Mr. J. Jervis Richardson; and Coleoptera from the Sibutu and Sulu Islands, by Mr. E. J. Burgess Sopp.—E. J. BURGESS SOPP, *Hon. Sec.*

RECENT LITERATURE.

J. W. TUTT.—*British Lepidoptera*. Vol. iii. 558 pages. London: Swan Sonnenschein & Co., Paternoster Square, E.C.

It is pleasant to be able to review such an eminently satisfactory book as is the third volume of 'British Lepidoptera.' Its predecessors were very welcome, but to a large number of entomologists the mass of material relating to the "Micros" was probably unread, and thus a large portion of vols. i. and ii. appealed only to a limited number. This third volume, therefore, should find more support, as the species treated of are all very well known to the great majority of collectors. The minutiae inevitably involved in such an undertaking are again manifest, and with what effect they have been utilized it is for each individual to judge for himself. It is strongly to be hoped that the necessary increased support will be forthcoming, and that many more numbers are in store for us.

The super-family Lachneides is continued, and the first species treated is *Pachygastris trifolii*, which occupies exactly thirty pages. Following this comes the species that has doubtless caused more research and taken up more time than any hitherto already done, viz., *Lasiocampa quercus*. Preceding the description and all that follows concerning the life-history of the type and its numerous forms and varieties, is a summary of the experimental work in the hybridizing of the different local races. Although nominally we have no chapter to commence vol. iii., this summary of hybridization is a very good substitute, and has as much general interest as any such that has appeared in the previous volumes. By the time the "Times of Appearance," "Habits," "Localities," &c., have all been worked through, eighty pages have been covered over this species alone, and it is doubtful if anything of any moment concerning this insect can have escaped Mr. Tutt's attention.

Passing on to *Macrothylacia rubi* and *Cosmotriche potatoaria*, perhaps one of the most interesting collection of facts is to be found in the length and diversified character of the habits of the larvæ of these two species. To the former as much as five and a half pages are alone given to this part of the scheme. *Gastropacha ilicifolia* comes, in its

turn, with full descriptions of larva, cocoon, pupa, food-plants, parasites, and so on; and the collector will doubtless read with avidity the "Habits and Habitat" section.

Under *Dimorpha versicolora* the question of its allies is freely discussed, and the reader is referred back to vol. i., pp. 124-125, and vol. ii., p. 440, for further discussion. One cannot help wishing, however, that the author would point out where (when possible) the imaginal characters are in agreement with the biological ones in assigning, or helping to assign, a position to a sub-family. The larval and pupal habits under this species are again full of interest, and cannot fail to engage the attention of both student and collector.

At p. 265 the super-family Attacides is brought under review. In the Preface the author says he is "entirely dissatisfied with his knowledge of the relationships of the various families of the Saturniides (Attacides) *inter se*, of those of the Sphingides *inter se*, and of these two super-families to each other." It, however, cannot be that he has not probed deep enough, for the thirty pages or so, before our only British Attacid (*Saturnia pavonia*) is treated, require the closest attention of the reader. The very thorough examination and diagnoses of the characters afforded by the larvæ of the Attacides will call for time and thought for full digestion.

From p. 342 to the end of the volume the classification and position of the Sphingides are discussed, and the complete natural history of the British species of Amorphenæ and Hemarinenæ recorded. Starting with Linnæus, and working through Fabricius, Scopoli, Lamarck, Latreille, Hübner, Laspeyre, Oken, Leach, Dalman, Ochsenheimer, Swainson, Boisduval, Stephens, Curtis, Duponchel, Duncan, and Westwood, a very complete review is given of the generic synonymy of the British Sphingids, and at the close a list of the types of the genera deduced is set forth. Another long diagnosis is given to the history of the super-family, and, starting with Réaumer, the works of Hübner, Stephens, Grote and Robinson, Butler, Herrick-Schäffer, Meyrick, Poulton, and Dyar, are all brought under the focus in the order given. On pp. 365-366 is a scheme, drawn up by Bacot, for separation into genera, based on larval characters, and close following is a family and sub-family division proposed by Chapman. Concerning the latter, one notes that the Sesienæ are only separated from the Eumorphenæ by the tufts to the abdomen, a character that certainly does not hold good throughout. Perhaps in vol. iv. some better character will be furnished when the true Macroglossids come to be reviewed. The high specialisations of both larva, pupa, and imago are fully discussed. The details concerning the pupa offer food for reflection, both as regards the proboscis-casing and the varying position of the glazed eye, which latter, if we are not mistaken, is brought forward for the first time. We have descriptions given of all the different hybrids produced in the Amorphenæ, not the least interesting being the comparison between the hybrids produced by *Amorpha populi* and *Smerinthus ocellata*, and hybrids from *Amorpha austauti* and *Smerinthus atlanticus*. A very complete classification of the forms and aberrations of *Mimas tilia* is to hand at p. 404, and the same long lists of localities are given, showing in many cases unsuspected curtailment or otherwise in the range of distribution. On

reference, for instance, to *Hemaris fuciformis*, it is noted as "exceedingly rare, if not entirely absent in Scotland and Ireland." No one, after this, will deny that these extended lists serve a purpose other than that for the collector.

In conclusion, there is only one matter we really regret, and that is that we have had to wait two years for the present instalment. It is pretty certain, however, that the book is all the more complete.

W. J. K.

RECENT ECONOMIC LITERATURE.

(By G. W. KIRKALDY, F.E.S.)

G. DARBOUX and C. HOWARD. "Hilfsbuch für das Sammeln der Zoocecidien mit Berücksichtigung der Nährpflanzen Europas und des Mittelmeergebietes," pp. xii and 68. Berlin, 1902. Gebrüder Borntraeger.

THIS is a list of the "gall-makers" of Europe and the basin of the Mediterranean, arranged under their respective plants, the latter being catalogued alphabetically under their genera and species. The location of the attack is also indicated by signs. The title-page and preface are in German and French, and there is an alphabetical appendix of 183 genera of gall-makers. The little work is plainly but well "got up," and of convenient compass, and should be indispensable to students of galls and economic entomologists generally.

PROCEEDINGS of the 13th Annual Meeting of the Association of Economic Entomologists (1902, U. S. Dep. Agric. Entom. n. s. Bull. xxxi. pp. 1-103; two plates and four text fig.).

AMONG the numerous interesting papers read at the 1901 meeting were E. P. GILLETTE's account of the Codling Moth (*Carpocapsa pomonella*), and notes on Colorado Insects; E. P. FELT, on the Hessian Fly (*Cecidomyia destructor*), and observations on forest and shade tree insects in New York State; W. M. SCOTT and W. F. FISKE, on "Jarring for the Curenlio," with a list of the numerous Rhynchota and Coleoptera collected; C. L. MARLATT's Preliminary Report on the San José Scale; and H. GOSSARD's Review of the Whitefly (*Aleurodes citri*) problem. The discussion on the San José Scale (*Aspidiotus perniciosus*) seems to have been very animated, Marlatt and Howard holding that the pest was introduced from America into Japan, while Cockerell and Kellogg considered that it came to America *via* Japan. The Japanese forms were generally considered to be the true *perniciosus*.

E. E. GREEN. "Mosquitoes and Malaria" (1901, December, Botanic Gardens, Ceylon; Circular, 1st series, no. 25, pp. 345-68).

In common with all other practical investigators, Green holds that the connection between malarial fever and mosquitoes has passed out of the hypothetical stage; the only debatable point, even about which there is very little difference of opinion, is "whether the mosquito is

the sole medium of infection." The "mosquito"—of which twenty species belonging to nine genera are noted as Sinhalese, though only one species, viz. *Anopheles rossii*, Giles, "has been definitely proved to convey the malarial germs"—is pronounced guilty of an appalling series of crimes; malarial fever, filariasis (including elephantiasis), excessive anæmia, yellow fever, and "after-effects" following repeated attacks of malaria, such as the dangerously enlarged spleen so prevalent amongst natives, derangement of the liver, &c., "Bright's Disease," &c. It is therefore obvious that practical studies in the most minute detail are of the highest national importance, and it is remarkable that British entomological journals should have devoted so little attention to notices of some part at least of the vast amount of work already done.* It is evident from perusal of the daily and weekly newspapers that an enormous amount of misconception and pig-headed ignorance as to the causes of malarial fever, &c., still remains to be combatted.

As these Circulars are primarily for the benefit of residents in Ceylon, not specially entomologists, the present one is necessarily to a certain extent a compilation; at the same time the whole subject is very adequately treated in the brief space at the author's disposal, and it is evident that Mr. Green has thoroughly and practically investigated the details discussed.

Preventive measures are considered at some length.

1. "*Those aimed at the extermination of the mosquito*"; and 2. "*The elimination of the malarial element*."—To destroy the early stages in their breeding-pools, as advocated by L. O. Howard, rags soaked in kerosine are employed for painting the surface of the water, thus forming a thin film, which is rapidly fatal to the inhabitants of the pools. Of course this treatment is not feasible for drinking-water; the tanks or cisterns for this should be constructed with closely fitting covers. Moreover, as the oil is as destructive to plants as to animals, it is inapplicable for ornamental lakes containing water-plants, or for rice-fields. A good system of drainage of useless pools is strongly advocated. For protection against the adults, "mosquito cones," castor-oil plants, &c., are considered entirely useless; the isolation of active "cases" of malarial fever and the proper use of quinine are advocated.

3. "*Protection from the bites of mosquitoes*."—The construction of mosquito-proof bungalows, such as have been experimentally erected in Africa and Italy, and are in use in America, is recommended; but Mr. Green fears that the question of expense and the æsthetic feeling of those who would dislike to reside in a huge meat-safe are likely to prevail at present. The use of properly constructed mosquito-nets and applications of various substances, particularly common soap, are advised, the latter being very effective for curative purposes.

JOHN B. SMITH discusses interesting insecticide experiments at some length in "The Entomologists' Experimental Orchard" (1902, New Jersey Agr. Exp. Sta., Bul. 155, pp. 1-71).

* See, however, 'Entomologist,' 1900, pp. 133, 218, 363, &c.

MALCOLM BURR. "The Earwigs of Ceylon." 1902, Journ. Bombay Nat. Hist. Soc. for 1901, pp. 59-78 and 316-36; two plates (one coloured).

A VALUABLE account of the Sinhalese Forficularia, which are of special interest as embracing the long enigmatic *Dyscritina*, now, through the researches of E. E. Green, known to be the larva of *Diplatys*. After an introduction dealing with the external morphology of the group,* the genera and species are fully discussed systematically. Fifteen genera and thirty-five species (four new) are credited to the fauna; of these seventeen are precinctive, ten confined to the Southern Oriental Region, three extend over this and also over the Malayan Archipelago, one of the latter also over Polynesia; one is found in the Kamemns, and in Ceylon, and four are cosmopolitan. The large proportion—practically 50 per cent.—of precinctive species is doubtless due largely to the indifference of collectors in the Oriental Region. The two plates, by Mr. Schuster, are carefully drawn and effective.

Geographical Distribution.—R. F. SCHARFF publishes a preliminary note on the influence of the Pyrenees on the animal migrations between France and Spain. The details are taken from Vertebrata and Mollusca, with the exception of a reference to the butterfly *Parnassius apollo*, but the conclusions will be interesting to other workers. Dr. Scharff states (α) that although the Pyrenees formed an obstacle to the migration of animals between France and Spain, and *vice versa*, nevertheless they would readily be able to go round on the east and west sides; and (β) that the older, widely distributed species have travelled mostly over the mountain-ridges. It is also to be accepted as a fact that this migration took place in most cases before the Ice Age ("Über den Einfluss der Pyrenäen auf die Tierwanderungen zwischen Frankreich und Spanien," 1902 Verh. V. Internat. Zool. Congr. Berlin, 1901, pp. 1-5 [sep. ?])

Rhynchota.—MRS. C. H. FERNALD discusses the application of the type of the Linnean genus *Coccus*, and concludes that that distinction should be conferred upon *hesperidum* Linné. *Coccus*, therefore, replaces *Lecanium* Burmeister (= *Calypticus* and *Calymnatus* Costa). The species so long known as *Coccus cacti* will, as shown by Cockerell, now bear the name *Monophlebus cacti*. We are glad to learn that Mrs. Fernald will soon publish a synonymic Catalogue of the Coccidæ. Owing to their economic importance, stability in their nomenclature is more important even than in other groups, and many wide changes have been effected in this respect since the appearance, in January, 1899, of the first supplement to Cockerell's Check-list (1902, "On the type of the genus *Coccus*, L." Canadian Entom., pp. 232-3).

* Mr. Burr believes that many "so-called cases of gynandromorphism are merely males with one branch of the forceps undeveloped, *i. e.* simple, and resembling those of the female. In all the instances that I have seen there have been nine abdominal segments visible, as in the normal male."

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